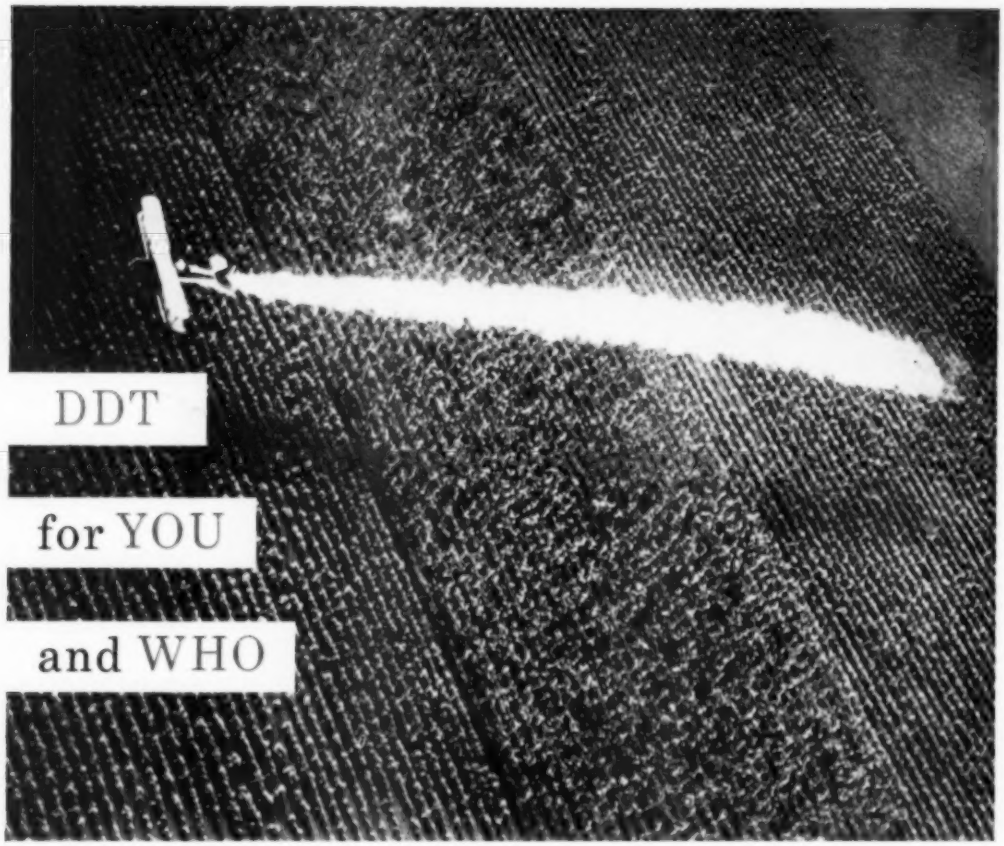
Vol. 7, No. 8 AUGUST, 1952

AGRICULTURAL CHEMICALS

In This Issue:

Role of Entomology in Point 4 Program • Safe Handling of Anhydrous Ammonia • Pacific AAEE Meets Nat'l. Agricultural Chemicals Assn. to Meet • Fertilizer Section of ACS to Atlantic City Conference Sulfur Supplier Says Shortage Past • Phytopaths to Meet • Pennsalt's New Insecticide Plant Pictured



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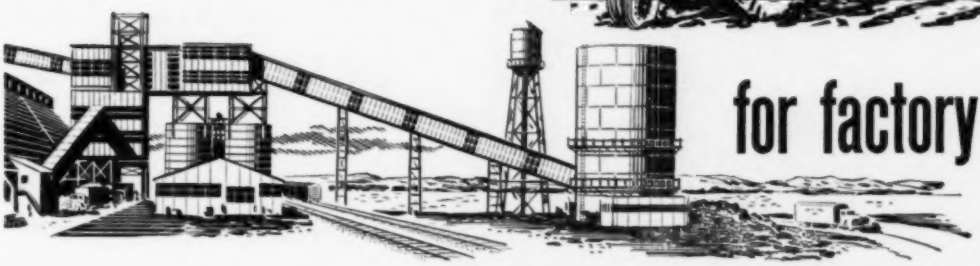

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THIS MONTH'S COVER

Pennsylvania Salt Mfg. Co. has opened a new insecticide emulsion plant at Montgomery, Ala. Technical BHC, shipped from Natrona, Ala., is broken up and fed into melters for preparing emulsions. (See page 52).

VOL. 7 No. 8

AUGUST 1952

A Monthly Magazine For the Trade

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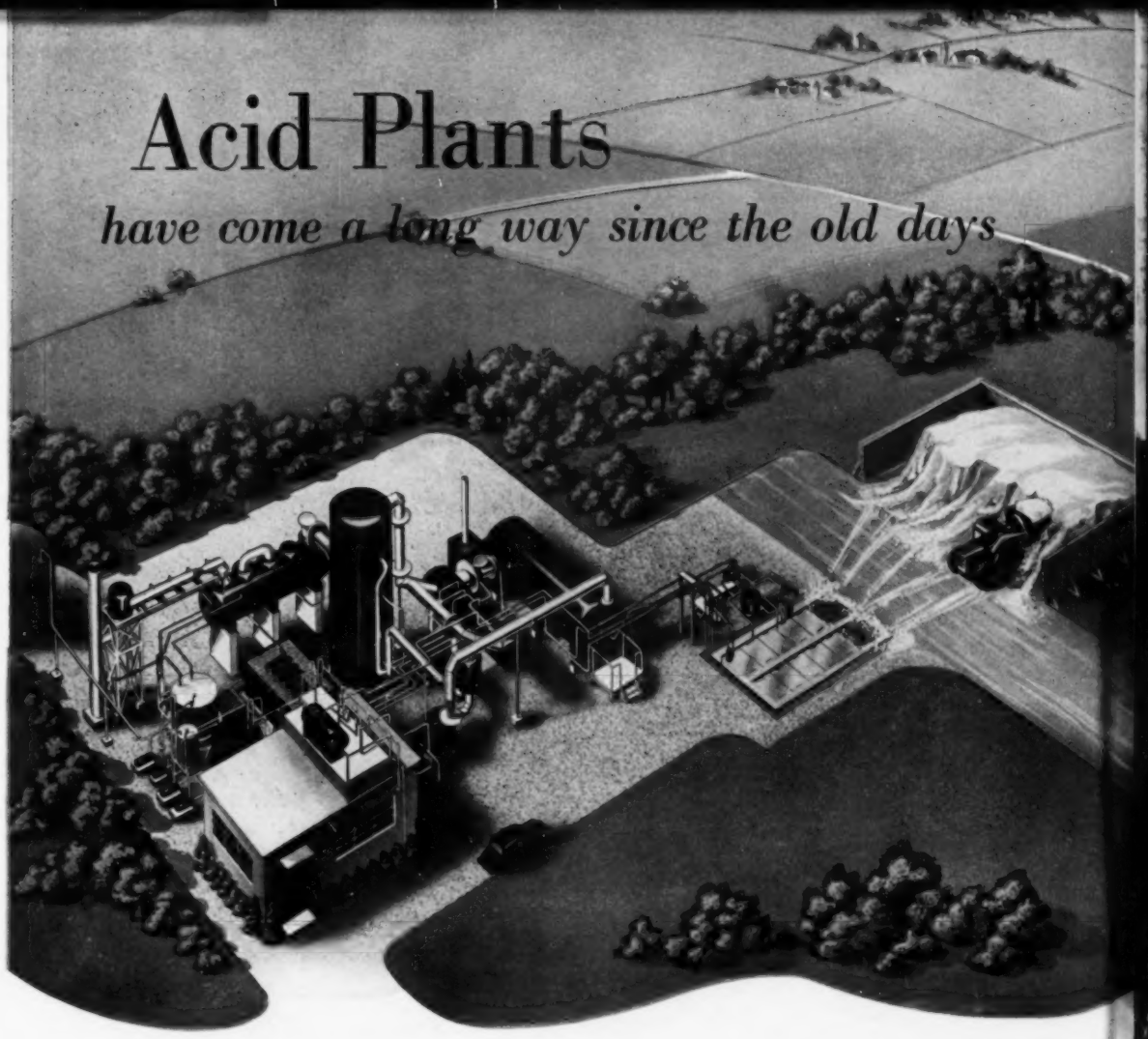

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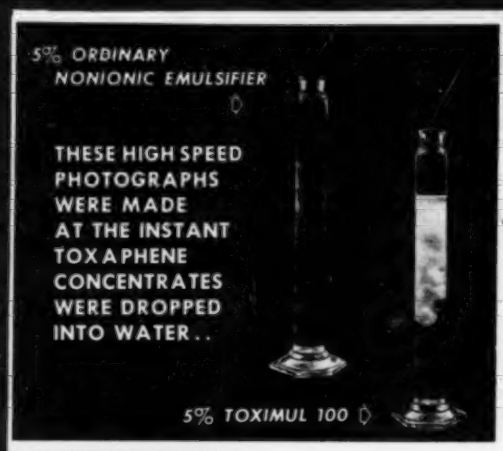

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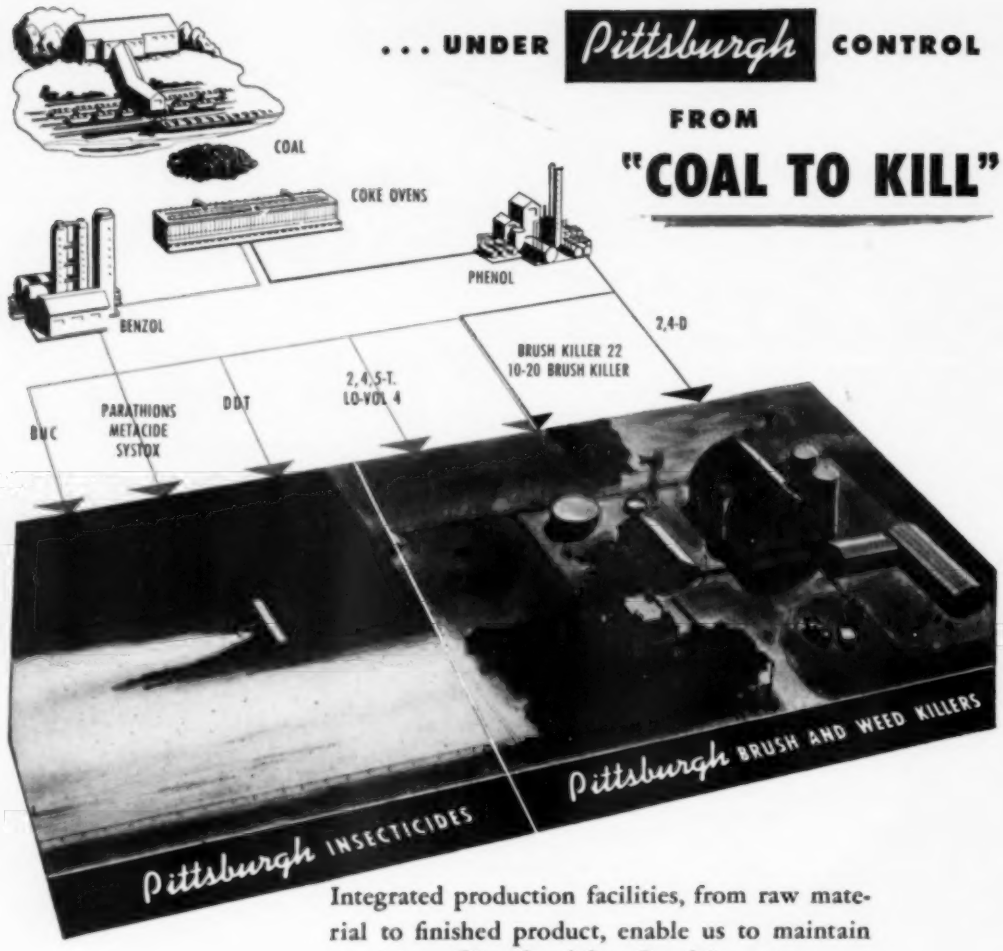

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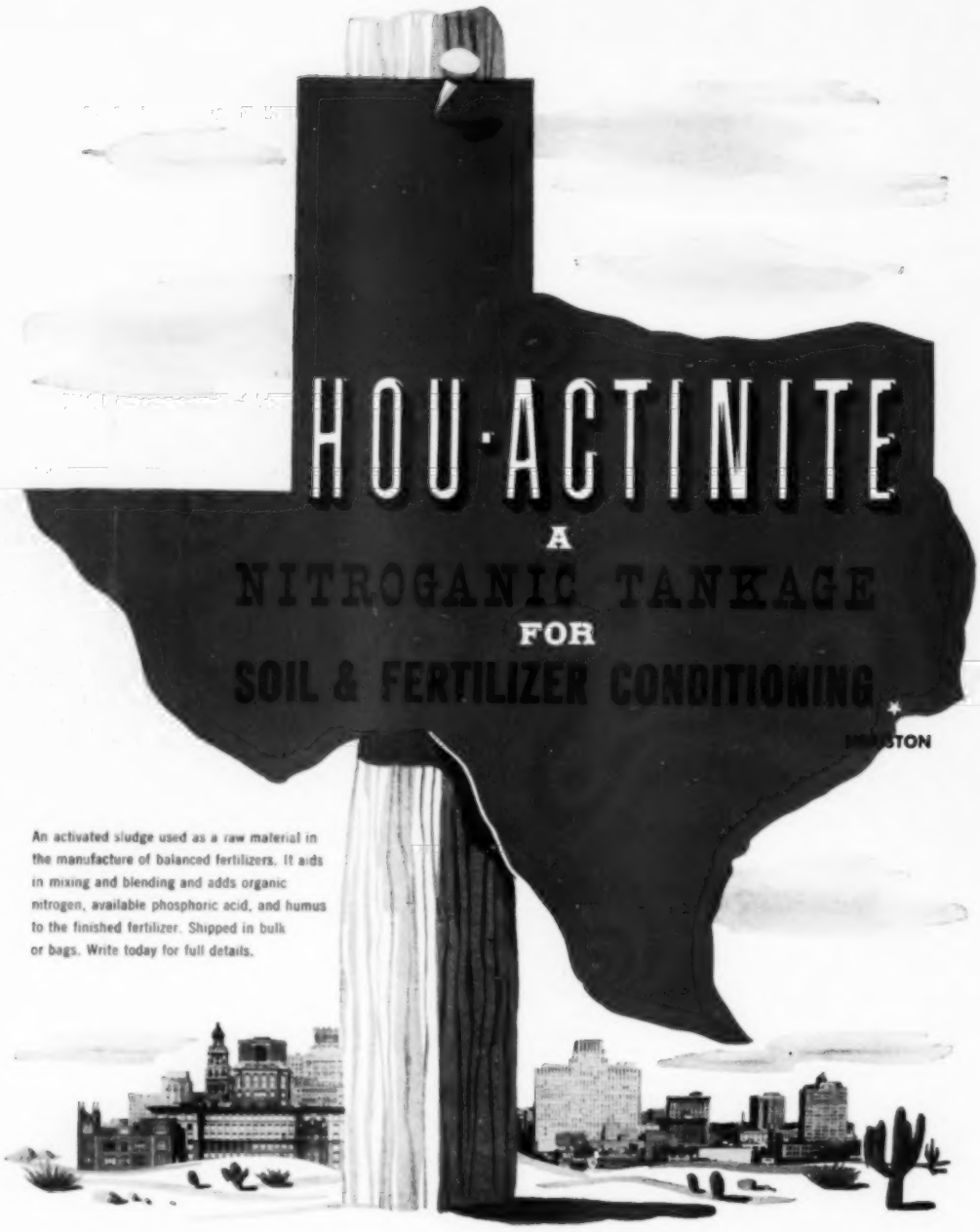

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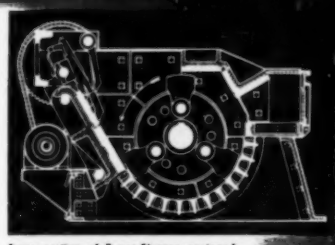

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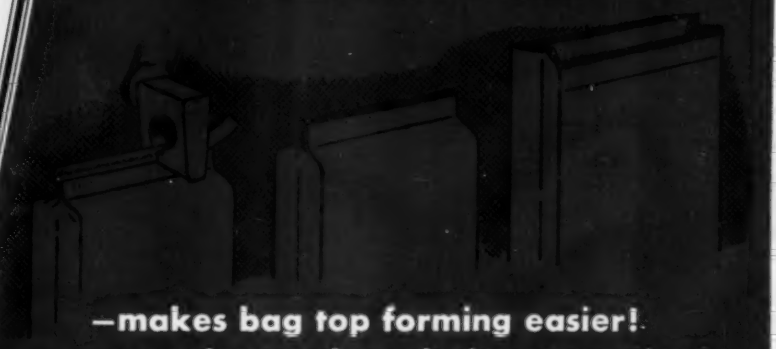

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THE EDITOR COMMENTS

UNEASINESS is being felt by public-relations-conscious persons in the fertilizer trade, regarding the effect of certain soil conditioner ads appearing prominently in Sunday supplements and other media across the country. They are afraid that disappointment in some of the more questionable brands of conditioners may cause the public to associate such with the fertilizer industry, since some of the conditioner ads say that the products contain plant nutrients. In reality, of course, this is a complete exaggeration.

The best-known producers of soil conditioners, such as American Cyanamid Co., and Monsanto Chemical Co., firms whose products have been well tested and truthfully advertised, are naturally unhappy over the situation. They are in the position of having started a small fire, only to see it grow into a conflagration, practically out of control.

It appears that soon some of the unethical makers of soil conditioners are likely to be unhappy, too, since a crackdown by the Federal Trade Commission on firms producing "misleading" advertising appears to be imminent.

A recent survey by the New York *Journal of Commerce* with universities and other research agencies engaged in testing soil conditioners, indicates that although some of the products now being marketed meet claims fully, others are relatively ineffective and "certainly do not appear to justify the advertising claims made about them."

The sensational-type advertising campaigns, resembling closely the medicine-show copy of yesteryear, make claims based on only superficial testing and the copy usually makes no mention of the fact that the product's effectiveness varies greatly in different types of soil, method of use, etc.

Research by independent groups indicate that not only do soil conditioners fail to contain "plant nutrients" as claimed in some more flagrant cases, but that many are scarcely one-twentieth as effective as the best brands. One research group reports that some of the new brands of soil conditioners form "soil aggregates" all right, but the sponge-like aggregates dissipate with the first rainfall, leaving the soil just where it was at the beginning . . . and the user a poorer, wiser, and probably very wrathful man.

Our hope is that the soil conditioner situation may be straightened out as speedily as possible so that the sheep may be clearly distinguished from the goats. People in the industry who know how the public reacts have reason to be uneasy. They know that an entire industry can get a black eye over the misrepresentations of just a few, and legitimate manufacturers naturally don't want this to happen.

WHAT is the actual story on the sulfur situation? People in both the pesticide and fertilizer fields of agricultural chemicals would certainly like to have the picture cleared up.

Recent statements by a leading sulfur producer indicate that demand for the mineral is now in balance with supply, while authorities in Washington and elsewhere declare that there is still a serious deficit in the supply. The latter groups maintain that the scarcity will continue until 1955 when additional production facilities, now under way, will be in full swing.

Meanwhile, the pesticide trade is facing a cutback in the amount of sulfur available for its needs, particularly its requirements for next season. Should this cutback become a reality, it will be hard to convince the insecticide trade that the shortage is over.

It has been pointed out that such a reduction in insecticidal use of sulfur would make possible enough sulfuric acid to produce nearly a million additional tons of superphosphate. This, too, is a necessary requirement, which means that "enough" sulfur for one group will mean an insufficient supply for the other. If this is the case, then the shortage definitely isn't over. There are still some belt-tightening days ahead.

As fertilizer industry becomes more safety conscious, greater efforts must be put forth to assure accident-free operations. Here a fertilizer man discusses

Safe Handling of ANHYDROUS

LIQUID nitrogen compounds and solutions are here to stay, and in the future will undoubtedly find even wider acceptance than they now enjoy.

From a safety standpoint, the major part of this discussion will be concerned with anhydrous ammonia because it is the basic source of synthetic nitrogen and because it requires more care in handling than any of the other nitrogen solutions. More compression is required at ordinary temperatures to hold it in a liquid state, than any of the others.

On the other hand, anhydrous ammonia, containing 82% N by weight, is the most concentrated source of N available to the fertilizer industry. At normal temperatures and at atmospheric pressure it is a gas with a very strong and characteristic odor. It boils at -28°F. at atmospheric pressure. At 70°F. its vapor pressure is 114#/sq. in. gauge and at 100°F. its vapor pressure is approximately 200#/sq. in. gauge.

Of course, this means that anhydrous ammonia can be handled only in equipment capable of withstanding these high pressures. Also, the method of handling is necessarily in accordance with procedures established by theory and practice in handling high pressure gases. No chances should be taken since one error which, on the surface, appears minor, could result in a major catastrophe affecting not only plant property and lives of workers, but also the entire city or community surrounding the plant.

On the other hand, anhydrous ammonia can be absolutely safe if handled in a properly designed plant by operators who will observe simple rules and regulations established by engineers and supervisors who are thoroughly familiar with handling procedures for potentially dangerous materials such as liquified anhydrous ammonia.

It is the duty of the design engineer to see that the systems are designed in accordance with all applicable safety codes. It is also his duty to see that the system is as simple as it can possibly be and still comply with known safety regulations, and of course, accomplish the purpose in processing for which it was intended.

Whenever possible the system should be made foolproof, thereby protecting everyone against human errors of omission and commission. All who supervise workmen know that these errors are bound to occur. Thus, design and construction engineers carry the responsibility of protecting lives and property against damage *when* errors are made—not if they are made; for mistakes are certain.

On the other hand, it is the responsibility of fertilizer men to note errors made by employees and to see that mistakes are not repeated. In a properly designed plant, the errors usually cause only spoilage of materials of manufacture, loss of time, or both. Of course, even with observance of all known safety precautions in plant design, it is still possible to have serious trouble such as an explosion or loss of enough ammonia to cause the evacuation of a community. But in a properly designed plant, such events can occur only in cases of gross negligence.

The odor of ammonia is generally considered one of the major drawbacks, but from a safety standpoint, this is one of its greatest assets. The slightest leak in tank or pipe lines usually announces itself by odor and for this reason is not likely to go unnoticed. Ammonia gas is toxic to human beings in moderate concentrations; however, due to its extremely strong odor no worker will willingly stay in a concentration which will have serious after-effects. In other words, if left to his own devices, the worker clears out before ammonia gas has a chance to harm him. One-tenth of 1% is usually unbearable. Even at this con-

by
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Applied Engineering Co.
Orangeburg, S. C.

AMMONIA

centration, no serious permanent physical damage results for periods of exposure even up to one hour. One can be sure than no worker will try this one hour test even at concentrations of 5/100 of 1% unless he is wearing a mask.

Masks Necessary

IF it is necessary for a worker to go into an area of high ammonia gas concentration, a canister type gas mask of full face design is safe for ammonia up to 3% if exposure is for a short period of time. If concentration is greater than 3%, is unknown, or exposure is to be prolonged, then supplied air respiratory equipment with full face mask and protective clothing should be used. Masks and protective clothing should be of the types approved by the United States Bureau of Mines and should be used in strict accordance with the manufacturer's recommendations.

In a properly operated system, the worker should never have an opportunity to come in contact with liquid ammonia. It is impossible however, to design a system where the operator cannot come in contact with this liquid if he fails to follow operating instructions in disconnecting a tank car after unloading it into his storage system. There is one thing we would like to state at this time: few operators ever come in contact with the liquid more than once. Give them one small dose and they certainly remember to respect the harmless looking fluid thereafter!

Liquid ammonia at atmospheric pressure looks like water but its temperature is -28°F. When placed on the skin it immediately freezes the area contacted, thereby removing the skin and causing what is commonly called an ammonia "burn." If an appreciable area of the body is covered with liquid ammonia it can be very serious. In fact, the majority of serious injuries and deaths associated with anhydrous ammonia are the result of human contact with liquid ammonia. Most of these serious injuries are caused by equipment rupture due to faulty design, hoses bursting due to neglect or improper selection, or gross disregard of operating procedure.

The best immediate treatment for a person who has been in contact with liquid ammonia is to deluge the affected part with water. The water serves to transfer heat to the affected part and at the same time removes the alkaline ammonia. For this reason deluge, treadle, or closed rope operated showers should be immediately adjacent to unloading stations or any other place where there is a possibility of liquid ammonia coming in contact with operators. Bubble type eye wash fountains, or at least a large pail of water, should always be on hand at these points to cleanse the eyes if ammonia comes in contact with him.

No unloading operations should be carried out unless respiratory equipment is on hand. No work should be performed on equipment handling anhydrous ammonia unless shower and respirator are immediately available. These operations are the ones where there are more possibilities of an accident than in any other involving liquid ammonia.

One common source of minor danger from liquid ammonia is the improper emptying of hoses between tank car and unloading station. If the operator does not follow operating procedure and should disconnect a hose from a tank car in which there is still liquid, the liquid in the hose will partially evaporate, thereby cooling the portion remaining to -28°F. The liquid will be held in a loop of the hose until the operator lowers the hose, letting it run out of the end. If the liquid touches the operator, it results in a slightly damaged (unless it hits his eye) but thoroughly frightened man.

One of the most difficult tasks in safety work is in keeping our employees constantly aware that a danger exists. For illustration, in the handling of anhydrous ammonia, at first the men will probably be overly cautious and actually afraid of the entire operation. As time goes on and nothing happens they will gain confidence and finally will carry on their operations as if they were handling water. This is the danger point and some action should be taken by management to awaken their employees to the fact that carelessness can result in danger to everyone.

Experience in plants making high explosives indicates that if left to their own devices, the majority of operators would sooner or later handle the material in ton lots just as if it were so much sand. To combat this careless attitude, weekly explosion was instituted for each shift and every man was forced to see four ounces detonated. This detonation left quite a sizable hole in the ground and at least partially awakened them to the consequences wich would result from detonation of the large quantities they handled in their work.

As stated before, anhydrous ammonia storage and handling systems should be designed by competent engineers with experience in handling materials of this nature. A few of the points to watch in layout, selection of equipment and operation are:

(1) All vessels should be A.S.M.E. Code stamped for 250# working pressure. An absolute minimum should be 200# since this is the appproximate vapor pressure of ammonia at 100°F. As is well known, A.S.M.E. Code means the vessel is built to the standards established by the American Society of Mechanical Engineers. The stamping means it has been inspected by an independent agency and approved in accordance with these standards. This code is the accepted standard in the United States. The theoretical safety factor is 4 to 1 under the code for anhydrous ammonia vessels. This means that the vessels theoretically would not burst until the pressure became 1,000# / sq. in.

(2) All piping, valves and fittings should meet with all applicable codes. Sometimes this means that one must deal with state, city and various insurance companies. Often the requirements of each may differ somewhat, therefore, one must comply with the most stringent. Some states do not have pressure vessel laws or laws governing storage and handling of anhydrous ammonia. Most of these non-code States will soon fall in line with the many states which have regulatory laws for operations such as we are discussing. For this reason, good engineering practice should be followed in all cases and codes of states which have laws should be met. This should be done for two reasons: first, to insure safety and second, to keep down the possibility of condemnation of one's entire setup when the state does pass safety laws.

(3) No brass or copper should be used on ammonia systems. Copper and copper alloys are rapidly attacked by ammonia. This causes some difficulty in selection of fittings, instruments, compressors, etc., since the majority of standard items have some brass parts.

(3) Remember great quantities of ammonia are being stored in bulk tanks. It is something valuable dollarwise, but, if for some reason a leak should develop and cannot be stopped, the resulting damage can possibly amount to far more than the cost of the ammonia. Fifteen thousand gallons of ammonia, if let loose, could cause evacuation of a sizeable city should the wind conditions be right. It is not a material that can be transferred to another spot and then work on the empty tank. It would be a rare occurrence to have another tank or tank car on hand to which the material could be transferred.

The moral to this is that the minor connections on tanks, valves, gages, etc. should be selected with meticulous care and properly installed. Double safety precautions should be taken at many points where experience has shown that there is a possibility of weakness in the chain.

(5) A proper analysis of piping layout should be made to eliminate any possibility of the trapping of liquid ammonia in any closed space without chance for expansion. Ammonia has a very high coefficient of expansion and pressures of many thousands of pounds per square inch can be built up in a matter of minutes when the sun warms a pipe line.

(6) Approved and reliable measuring devices should be installed. Hydrostatic pressure can build up on a storage tank if filled too full which can be a very serious matter since the tank may rupture. Detailed operating instructions should be prepared by the layout engineer. These should be strictly adhered to and changed only by someone competent to know what the result of the change will be. No unskilled operator should be allowed to deviate from the posted instructions. In ninety-nine cases out of one hundred, he would have no theoretical knowledge of the handling of liquified gases and therefore could not predict the possible consequences of even a minor deviation from routine.

(8) Even the seemingly simple matter of spotting a tank car should be done by rigid rules. These rules are standard for handling any hazardous material. Some of them are: car should be on a level track, have the brakes set, wheels blocked, and regulation blue "tank car connected" sign affixed to the rails. Derails should be placed at one or both ends of the unloading track approximately one car's length from the car being unloaded unless the car is protected by a closed and locked switch or gate.

(9) Certain proportions of air and ammonia are flammable, therefore, no welding should be done on equipment holding ammonia until the equipment is thoroughly purged

(*Turn to Page 119*)

A New Silica for Formulating

75% DDT Wettable Powders

by

Wm. E. Bissinger, C. L. Cormany and W. R. Dial

Columbia—Southern Chemical Corp.
Barberton, Ohio

THE highest loading of DDT in commercial wettable powder formulations was 50 %, before the early part of 1951. Since that time, a number of manufacturers have announced the availability of a 75% wettable DDT, the advantages of which are self-evident from the viewpoint of shipping costs, particularly on long hauls such as in the export trade. Too, these higher concentrates of DDT are especially applicable in the rapidly developing field of concentrate sprays which is becoming so important in this country.

During the past fifteen years, the Columbia - Southern Chemical Corporation has introduced on a commercial scale, several new inorganic chemicals designed primarily as reinforcing pigments for rubber products. These compounds are hydrated calcium trisilicate ("Silene EF") and hydrated silica ("Hi-Sil"), both in a very finely divided state. Due to their uniformity in particle size, and because of their high absorbing power and good fluidity, it was desirable to evaluate the usefulness of each as a carrier for various organic insecticides. This report describes the results of the studies with DDT.

Meeting Specifications

CHIEF objective of these studies was to determine the maximum loading of DDT, while still producing a wettable DDT powder that would meet all the specifications of the U. S. Quartermaster Corps[1], and the World Health Organization[2]. For comparison, a commonly used clay was included in the study. The physical properties of the three diluents evaluated in this program are given in Table I.

It might be suspected that the slightly alkaline nature of "Hi-Sil" and "Silene" could cause decomposition of the DDT. To check this point, a series of accelerated stability tests with these diluents and various chlorinated organic insecticides was

Table I

Physical Properties of Diluents

Property	Hi-Sil	Silene	Clay
Bulk Density	7 ± 1 lbs./cu. ft.	10 ± 2 lbs./cu. ft.	27-31 lbs./cu. ft.
Specific Gravity	1.95	2.1	2.3 - 2.6
Average Particle Size	0.025 micron	0.030 micron	1-2 microns
Screen Test	0.1% max. on 325 mesh	0.1% max. on 325 mesh	15% on 325 mesh
Free Moisture	4-7%	4-7%	0.2% (as produced)
pH	8-9	9.8 - 10.2	Neutral
Color	White	White	Cream

Table II

Stability of Various Insecticides in the Presence of Hi-Sil and Silene

Organic Insecticide	Parts HCl Evolved Per 100 Parts of Insecticide	
	In Hi-Sil	In Silene
DDT	0.0	0.031
BHC (Technical	0.0	0.301
Toxaphene	0.0	0.423
Aldrin	0.0	0.03
Dieldrin	0.0	0.048
Chlordane	0.98	1.03

carried out, using the procedure developed by Fleck and Haller[3]. The correlation between this accelerated test and actual storage stability under normal conditions is not known. In these experiments, four parts of the respective insecticide was intimately blended with one part of "Hi-Sil" or "Silene," and the mixture then heated at 248° F. for one hour. From the amount of hydrogen chloride evolved and the chloride ion formed, the extents of decomposition shown in Table II were determined.

These results illustrate that with the exception of chlordane, all the common chlorinated organic insecticides are compatible from a chemical viewpoint with either of the diluents. However, it is not known what effect the loss of even these small quantities of chlorine with "Silene" may have on biological activity.

Mention of the word "silica," naturally brings to mind the problem of silicosis and the potential health hazards that might be expected for the formulators and users of insecticides compounded with "Hi-Sil." However, a very thorough investigation of this problem has been made by an independent laboratory, the Saranac Laboratory of the Trudeau Foundation, Saranac Lake, New York. This comprehensive study required three years for completion of the major part of the program, and a verbatim summary of their findings is as follows:

"Although the composition and character of 'Hi-Sil' pigment would lead one to expect that it might cause serious damage to the lung if inhaled and retained in appreciable quantity, the comprehensive inhalation studies conducted by The Saranac Laboratory show that 'Hi-Sil' dust is not particularly hazardous. The tissue reactions produced in the experimental animals exposed to a rather high concentration of atmospheric 'Hi-Sil' dust for periods as long as two years indicate that the inhaled dust caused only insignificant changes in the lung. In fact, on the basis of the reactions in non-infected animals, one might be tempted to include 'Hi-Sil' pigment in the large class of so-called inert dusts, such as iron oxide, carbon and most silicates. One finding which does not allow the classification of 'Hi-Sil' pigment as absolutely inert in normal animals is the occurrence of a definite, though very slight, fibrosis in the lungs of exposed rats. This tissue change, however, developed only after an unusually long exposure and therefore is somewhat discounted. For comparison, when rats are exposed to a definitely hazardous dust-like quartz, they customarily develop silicotic nodules within ten months and die of pulmonary disease before 18 months have elapsed. Another finding which opposes the absolute inclusion of 'Hi-Sil' pigment in the category of an inert dust is the fact that it exerted a definite but again only very slightly adverse influence on the course of a tuberculous infection in guinea pigs exposed to the dust. In comparison with the effect of inhaled quartz dust on a tuberculous infection, the influence of 'Hi-Sil' dust is of only a minor degree."

"Thus, the experimental investigation concerning 'Hi-Sil' pigment indicates that the material has the capacity to produce a definite but very slight change in the lung, but that such change occurs only after prolonged inhalation of the dust in high atmospheric concentration. Therefore, some degree of control should be employed to prevent an appreciable dissemination of the dust in the atmosphere, if for no reason other than for general hygiene."

In conducting this laboratory program on the grinding and formulation of DDT, the equipment was designed on a small scale, but every effort was made to operate under conditions that would parallel those in a large plant. For example, the use of masterbatching to distribute the wetting and dispersing agents uniformly was employed, a special micro-ribbon blender was constructed for mixing the powders, and a rapid feed rate in the pulverizer was maintained. As a result, it is believed the conclusions are directly applicable to large scale equipment.

Table III

Maximum DDT Concentrations Attainable by Grinding

Diluent	% DDT	Through 0.027 Screen	Through 0.013 Screen
Hi-Sil	75	Yes	Yes
	80	Yes	Plugged After 800 g.
Silene	60	Yes	Yes
	65	Yes	Plugged After 900 g.
Clay	50	Yes	Yes
	55	Yes	Plugged After 750 g.

Masterbatch Preparation

THE masterbatch consisted of 1 part of wetting agent (a liquid, non-ionic alkyl aryl polyether alcohol), 1 part of dispersing agent (a solid sodium lignosulfonate) and 2 parts of the diluent under examination. The wetting and dispersing agents were mixed and blended to a thick paste. Then the diluent under examination was slowly incorporated and after mixing by hand agitation to a dry, free-flowing powder, the mixture was further blended on a roller mixer for 0.5 hour. Finally it was passed through a Bantam Mikro-Pulverizer fitted with a 0.027 HB screen. Following another brief period of roll milling, the wetting agent masterbatch was used for the preparation of the DDT wettable powders.

Formulation and Blending

A calculated weight of the appropriate masterbatch sufficient to provide 2% each of both the wetting and dispersing agent was placed in a laboratory size ribbon blender constructed of iron and measuring 10" long, 8" wide, and 12" deep. The required weight of powdered DDT (set point: 90.1° C.) and diluent was then added, and the mixture blended for 0.5 hour. Thorough blending was found to be imperative in order to reduce the aggregates of DDT. In some of the preliminary studies a satisfactory disintegration of the DDT agglomerates was not obtained, and during pulverizing the screens soon became plugged.

Milling Wettable Powders

FOR this milling operation a radial feed "Bantam Mikro-Pulverizer" produced by the Pulverizing Machinery Company, Summit, N. J. was employed. Preliminary studies showed that on prolonged grinding of the diluents only, the internal temperature of the mill reached equilibrium at approximately 50° C. Since this higher temperature would

be encountered in a commercial operation, and since the higher temperature would cause more frequent plugging of the screens, an attempt was made to simulate large scale conditions in all of our studies by preheating the pulverizer to 50° C. by first grinding large quantities of the diluent. When this temperature was reached, 2500 grams of the mixture under study was immediately milled. The material was fed into the pulverizer at the periphery using closed air ports and a mill speed of 14,000 r.p.m. It is understood that in at least some commercial units the mills operate at 7000 r.p.m., but when this reduced speed was used in the current program, a sufficiently small particle size in the final product could not be produced. This difference can possibly be attributed to a lower linear speed at 7000 r.p.m. which may exist in the "Bantam Mikro-Pulverizer," as compared to the larger commercial mill.

Two grindings were used, the first through a 0.027 HB screen, the second with a 0.013 HB screen. Each required 4 - 6 minutes. In Table III are listed the results observed with increasing concentrations of DDT and the different diluents. The DDT concentrations were increased by increments of 5% in each case. The size of all batches was 2500 grams, and a total of 4% of wetting and dispersing agent was always included.

Table III shows that the maximum DDT content permissible under these particular grinding conditions is 50% with clays, 60% with "Silene," and 75% with "Hi-Sil." Obviously, with less severe grinding conditions, all of these figures would be increased, but then the product would not meet the specifications required by the QMC and WHO.

Because "Hi-Sil" and "Silene" are of such small particle size, their bulk density is low, and correspondingly, the DDT wettable powders formulated with them are somewhat more voluminous than when clay is the diluent. Table IV lists the bulk densities of the various formulations at their maximum DDT content.

(*Turn to Page* 117)

Table V

Compliance with QMC Specifications

Test	75% DDT-Hi-Sil	60% DDT-Silene EF	50% DDT-Clay	Specification Requirements of QMC
Color and Appearance	White, free flowing[1]	White, free flowing[1]	Lt. tan, free flowing[1]	Lt. color, free flowing and readily wettable.
Foaming	Passed	Passed	Passed	Such as not to interfere with specification tests.
Average Particle Size[2]	Not Run	Not Run	Not Run	Surface-mean particle diameter 0.5 micron max.
Maximum diameter[3] (Caking)	99.8%	99.9%	99.7%	Not less than 99.0-%shall pass through No. 200 U.S. Standard sieve (Wet Method)
Dispersibility[3]	93.2%	93.6%	92.2%	Not less than 90% shall pass through No. 60 U.S. Standard sieve (Wet Method)
Reaction (pH)[4]	8.7	9.4	7.6	Limits pH 5-8.

[1] For wettability characteristics see World Health Organization specifications. No specific QMC test is given.
[2] The specialized equipment required for this test was not available.
[3] Test run on samples pretreated by heating at 55° C. under 25 g./sq. cm. pressure for 24 hours.
[4] Determined on distilled water slurry.

Table VI

Compliance with WHO Specifications

Test	75% DDT-Hi-Sil	60% DDT-Silene EF	50% DDT-Clay	Specification Requirements of WHO	
				Nominal Range, %	Permitted Deviation, %
DDT content	74.3	60.1	49.9	50-60	2 below
				61-84	1.5 below
Foaming	Passed	Passed	Passed	Shall not interfere with specification tests.	
Particle Size	99.8%	99.9%	99.6%	Min. of 98% passing through U. S. No. 200 Standard sieve (Wet Method)	
Agglomerate	100%	100%	100%	Min. of 99.95% passing through U. S. No. 18 Standard sieve (Wet Method)	
Settling Rate	0.074 g.	0.19 g.	0.13 g.	Min. of 2.0% DDT in suspension after 30 min. (0.5 g.)	
Resuspendability[1]	Marginal	Marginal	Marginal	Shall not show caking after standing 4 hours.	
Reaction (pH)	8.7	9.6	7.8	Limits pH 5-8.	
Wettability	31 sec.	27 sec.	31 sec.	Max. of 60 sec. for complete wetting of 5 g.	
Tropical Storage	Not Run	Not Run	Not Run		

[1] Interpretation difficult for other than extreme failures.
[2] The storage test under **dry** conditions is the same as the QMC caking test (see Table V). A storage test under **humid** conditions was not made because specially humidified chambers were not available.

NAC's Fall

Largest meeting in Association's history scheduled. . . . . Speakers represent unusually broad section of the agricultural chemical field

Meeting Dates:

September 3, 4 and 5, 1952

Place:

Essex and Sussex Hotel
Spring Lake, N. J.

(Accomodations also to be available at Monmouth Hotel, adjacent)

PROGRAM plans are well under way for the annual fall meeting of the National Agricultural Chemicals Association to be held at the Essex and Sussex Hotel, Spring Lake, N. J. Speakers representing the manufacturing industry, agriculture, education and state and federal government services are scheduled to appear on the three-day program September 3-5.

The meeting will open with talks by NAC president A. W. Mohr, president, California Spray-Chemical Corp., Richmond, Calif.; and Paul Mayfield, NAC vice-president, general manager of Hercules Powder Co., Wilmington, Del.

Featuring a full program the morning of September 3, the NAC has announced that in addition to Messrs Mohr and Mayfield, the following will also appear on the platform:

Dr. Clair R. Spealman, chief, Safety Projects Branch of the Civil Aeronautics Authority, will discuss

Meeting

ARTHUR W. MOHR
NACA President

PAUL MAYFIELD
NACA Vice-President

LEA S. HITCHNER
NACA Exec. Secretary

"Medical Interest in Application of Agricultural Chemicals."

W. A. Minor, assistant to the Secretary of Agriculture, Washington, D. C., is scheduled to discuss the role of chemicals in providing food to fill the "fifth plate" expected to be added because of sharp increases in population.

Final speaker of the morning will be Dr. Paul D. Sanders, editor, *The Southern Planter*, Richmond, Va., who is expected to discuss the need for increasing agricultural production through greater use of chemicals and improved cultural practices.

Thursday's program will lead off with Dr. H. H. Shepard, staff specialist, Office of Materials and Facilities, Production and Marketing Administration, U. S. Department of Agriculture, Washington, D. C. Dr. Shepard will present a summary of pesticide requirements for 1952 and 1953, based on extensive surveys made by his office.

"Where to Get a Supply of Technical Personnel" will be the topic of a talk by Dr. G. D. Humphreys, president of the University of Wyoming.

Dr. Oris V. Wells, chief of the Bureau of Agricultural Economics, U. S. Department of Agriculture, Washington, D. C., will continue the program, followed by Dr. W. W. Dykstra, assistant to the Chief of the Branch of Predator and Rodent Control, Fish & Wildlife Service, U. S. Department of the Interior, Washington.

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Panel on Friday

FRIDAY morning's session will feature a panel discussion covering the problems of exports. Among those to appear on the panel are Richard L. Davies, Pennsylvania Salt International Corporation; Earl R. Beckner, Office of International Materials Policy, Department of State; Phillip H. Groggins, National Production Authority, Dept. of Commerce; and Dr. Ralph Stewart, di-

DR. PAUL D. SANDERS

AVERY S. HOYT

DR. O. V. WELLS

rector, Agricultural Products Division, Office of International Trade.

Preceding the panel will be Lea S. Hitchner, executive secretary and treasurer, NAC Association, Washington, D. C.; Dr. Avery S. Hoyt, chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington; and Dr. George C. Decker, head, Section of Economic Entomology, State Natural History Survey Division, Urbana, Illinois.

Speaking sessions are to begin promptly at 10 a.m., leaving the afternoons free for committee meetings, golf, and surf bathing. John Rodda, U. S. Industrial Chemicals Div. is in charge of the annual golf tournament. Plans for the entertainment of wives have been made and there will be dancing every night, according to the Association. A reception will be held Wednesday night and the annual banquet Thursday evening. No speakers are scheduled for that occasion, the NAC says.

According to Mr. Hitchner, the largest advance registration on record has already come in, making it likely that facilities at the Essex and Sussex will be exhausted. Arrangements have been made for additional rooms and suites at the Monmouth hotel adjacent in event of an overflow crowd at the Essex & Sussex.

W. A. MINOR

PHILLIP GROGGINS

DR. GEO. C. DECKER

The important role of ENTOMOLOGY in the Point 4 Program

by
E. J. Hambleton*

AMERICAN entomologists are naturally concerned primarily with entomological research and control as they are related to domestic problems of food production and health protection. The field is a broad one, however, and it is important to discuss the role being played by entomology in the program of technical cooperation in the underdevelped nations of the world; the program known as "Point Four."

Point Four is sometimes referred to as a "give-away" program. But it is not that. It is just a simple way of helping people help themselves. Point Four does not operate where it is not wanted. Every Point Four project grows out of a request from a foreign government. Each project then develops as a result of a cooperative agreement between the Technical Cooperation Administration in the United States and the country making the request. Personnel, funds, equipment, and other contributions are all specified in the agreement. The recipient country contributes the equivalent of three dollars for every American dollar that is spent.

Eighty percent of the Point Four work falls into one of three categories: food, health, or education. The most urgent of these is food. Therefore, Point Four administrators are concentrating first on helping people grow more food. At the same time they are teaching them how to wipe out disease and how to establish schools and train teachers. In the short period Point Four has operated, marked progress has already been made; but the program must be considered a long-term proposition if best results are to be accomplished.

In a recent address, W. Averell Harriman simply stated the basic purpose of all agricultural projects under Point Four: "We Americans, with our scientific knowledge, are literally helping grow two ears of corn where one grew before." You and I, as entomologists, know that this is possible in any underdeveloped country where certain changes can be easily introduced—changes such as improved seed, better preparation of the soil, use of fertilizers and pesticides, and adoption of more effective agronomic practices.

*Paper presented by E. J. Hambleton, Field Service Consultant in Entomology, Office of Foreign Agricultural Relations, U. S. Department of Agriculture, before 36th annual meeting of the Pacific Branch of the American Association of Economic Entomologists, Santa Barbara, Calif. June 24-26, 1952.

Some noteworthy examples of increased yields have already been reported by Point Four workers. In one area of India the yield of potatoes has been increased from 119 bushels per acre to 235, and the yield of wheat from 13 to 26. In El Salvador, corn yields have been doubled. Yet if we are to carry on and bring about other increases in farm products, we must not lose sight of the fact that we will have to provide facilities for proper handling and storing of food. If we do not, we will be growing two ears of corn where one grew before just to feed more weevils!

We entomologists are conscious of the fact that as crop production is improved, conditions are also brought about that are likely to favor destructive insects and to provide them with better means of becoming a constant menace. This fact should not be overlooked as we go forward in our technical assistance planning. Few farmers in the underprivileged areas of the world have any conception of the losses that result from insect attack. And even if they do, there has been little that they could do to fight back. I have always felt that, if we could find ways and means to protect from insects and diseases the crops *now* being grown, that alone would increase production to the point where we would no longer need to fear food shortages.

THOUGH most underdeveloped countries have tropical or subtropical climates, their insect problems are much like ours. They are confronted with many of the cosmopolitan species that have been widely distributed through commerce for many centuries. Among them are some of the most annoying and dangerous to man and most destructive to his livestock, crops, and food products.

The amount of insect control practiced by peoples in these countries is more or less proportionate to the kind of agriculture they carry on. In countries that have progressed in their agriculture, for instance, one will find some kind of organization with well-trained technicians. Too often, however, both the technicians and the necessary government support is wanting. Often, good conscientious workers are hampered by lack of funds, equipment, or transportation facilties and cannot do justice to their work. Handicaps like these, the customs of the people, their prejudices and beliefs—all combine to keep many a good worker confined to his office or laboratory. Progress in applied entomology cannot advance in a setup of this kind.

We in the United States are noted for our organization, our institutions, our eagerness to do things in a big way. We are great competitors, yet, in the interest of a common cause, we manage to work together. As new problems arise, we tackle them to the best of our ability. We are forever trying to improve this or that, devise short-cuts, develop labor-saving devices. Most of us take for granted the opportunities that our country has offered us for the development of our entomological organization—opportunities that have enabled us to make it the most practical entomological organization in the world. We need only to travel to almost any foreign country to begin to understand and appreciate the service that this organization has given to agriculture and general welfare in the United States.

In practically all branches of entomology, we have learned that other countries can be a source of inspiration to us. They have cooperated with us when we have gone abroad in research of parasites and predators of our insect enemies. Until World War II, however, our entomological contact in foreign areas—except for cooperative efforts between ourselves and the neighboring countries of Canada and Mexico—have been pretty much limited to this field of activity and to the problems of international nomenclature. During the war we found many opportunities to assist other countries in insect control; for instance, we were obliged to control bedbugs, lice, and mosquitoes to protect our own troops. It is very doubtful whether we would have taken the initiative to offer such protection to the natives of the South Pacific or elsewhere had we not been in the conflict ourselves.

Programs of international cooperation in pest control have been greatly stimulated as a result of the war and the position the United States has assumed in world leadership. Fortunately most of the other countries realize and accept the progress we have made as a matter of fact. They look forward to receiving our guidance and help in many fields, and we have much to offer. Our institutions and experiment stations, our State and Federal Governments, and our technical workers have the results of research to share, enabling workers of other lands to utilize our ideas and practical field experiences in insect control. The fact that we are recognized as leaders in economic entomology is an added reason why we should participate in international programs. Besides, as we in America become more and more dependent upon foreign countries to supply our strategic needs, it is only logical that we reciprocate by making available to them not only our manufactured goods but some of our know-how as well. Our problems of mutual interest and importance must be worked out cooperatively if we are to preserve the resources of the world.

Entomology can and should play a more active part in any Point Four program designed to increase the production of food. If entomology is to have its proper role, we will have to make every effort, both as individuals and as organizations, to influence those concerned with the planning of the Point Four program. The authorities of the recipient Point Four country must be informed and convinced of the need for insect control so that requests for technical assistance can be made and agreed upon in time for control programs to do the most good.

The history of conquering agricultural pests in the United States is filled with lessons for the entomologist abroad. They teach him such things as what pests to expect, what control methods to use, what pitfalls to avoid. They show him the importance of being foresighted about such matters as quarantine.

But agricultural pests are not the only ones that harass the world. For many years we have suffered from infectious human diseases that are insect-borne and by that means have been imported from one place to another. Yellow fever and malaria are good examples, both carried from victim to victim by mosquitoes. Everywhere, the problems of health and agriculture go hand-in-hand. Although in most countries medical science has advanced more rapidly than entomology, it is only in recent years that an attempt has been made to control some of the pestilential diseases that still sweep through large areas of the world in epidemic waves. Vast areas of the world remain undeveloped and their resources are denied to mankind because of diseases that are rampant.

Health authorities, like entomologists, are concerned with quarantines, which have served a useful purpose in preventing the spread of disease from country to country. The development of faster means of transportation, however, is limiting the effectiveness of quarantine protection; and attention is now being given to regional programs designed to attack and eradicate certain diseases at their source. This is a most constructive approach in the international health movement of today, in which collaboration has been really magnificient.

THE World Health Organization of the United Nations came into existence in April, 1948. Its membership includes at least 70 nations. Its objectives and scope of activity are far-reaching. The United States looks to this organization for leadership and guidance even though it is prepared to extend itself beyond the World Health Organization in its bilateral programs. Our first efforts in bilateral cooperation in health began nearly 10 years ago, when a program was launched by the Office of the Coordinator of Inter-American Affairs in 18 republics of Latin America. Major emphasis has been given to controlling insect-borne diseases such as malaria, typhus, and plague. During this period the threat of yellow fever has been greatly reduced in the Western Hemisphere by the Pan American Sanitary Bureau, which acts as the Health Organization's regional office for the Americas. Its campaign to eradicate the yellow fever mosquito *Aedes aegypti* (Linn) is having noteworthy success.

One of the biggest tasks that lay ahead when the program of economic aid to Greece and Turkey was initiated in 1947 was the control of malaria. So succesfully was it carried out that the disease, once a major problem in Greece, is now of minor significance. Throughout the Middle East and South and Southeast Asia malaria-control projects have included extensive DDT residual spray operations and the distribution of chloroquinine. Hundreds of thousands of dwelling of one kind or other have been sprayed in an effort to relieve the suffering of the people. American experts supervise these malaria- control teams; they train workers and provide technical guidance and assistance to governments in developing adequate health services.

In Iran alone last year 15,600,000 square meters of building surfaces were covered with a residual DDT spray, in a campaign that extended to towns and villages with a total population of nearly 450,000. In Pakistan, a malaria-control project that has been running for two years not only has brought about a drastic reduction in the malaria rates but at the same time has substantially improved the health and vigor of agricultural laborers and increased their productivity. As a result of control operations, a marked increase in agricultural output always occurs. The story is almost the same in all areas where this good work is being waged.

Cooperative effort in the control of agricultural pests has received less attention in technical assistance programs than has that of insect vectors of human diseases. This fact is easily understood, yet it in no way reflects the urgent need to wage all-out war on some of the pests that plague livestock and food and fiber crops in so many areas of the world that they are a matter for international concern. However, within the last few years, I am pleased to report, technical assistance administrators are viewing insects and the damage they cause in a new light. They are beginning to focus attention on losses caused by insects in terms of food production and to see how insect control projects might form an integral part in programs of technical collaboration. Entomology can and will play a more important part in technical assistance if given the opportunity. Fortunately it has already clearly demonstrated its value.

During the last 10 years the United States Department of Agriculture and the ministries of agriculture in half dozen countries of central and South America have conducted joint programs of technical cooperation. This work is now a part of the Point Four program, supervised by the Technical Cooperation Administration of the Department of State. Entomological assistance has been provided these countries by giving technicians specific assignments on a short-term basis. They have aided on such problems as the migratory locust; livestock pests; insects affecting cotton, coffee, citrus, lemon grass; insects that plague stored grain; and insects that carry human diseases.

Within the same period the Food and Agriculture Organization of the United Nations has sent experts to many parts of the world, particularly to Latin America and the Middle East. Their entomologists have studied grain-storage practices and have gathered and publicized facts about the losses caused by insects and other pests that invade inadequate storage facilities. FAO has estimated that in a single year the losses caused by rats, insects, and fungi to stored grains and rice alone totaled about 33 million tons in the granaries. This is enough food to keep 150 million people alive for a year. Cutting down these losses through modern techniques of storing and handling food supplies has been one of FAO's major problems ever since its establishment. FAO's assistance has led to the construction of safe storage facilities in several coun-

tries, thereby helping to eliminate the heavy losses from insects.

BUT grains are not the only crops that need protection. Livestock also suffer from insect pests. Raising livestock is one of the chief activities in most Latin American countries and is essential to their economy and well being. In Colombia alone there are more cattle than people. Two of the most serious cattle pests in the southern hemisphere range all the way from Mexico to Brazil. These are the cattle tick, *Boophilus annulatus* var. *microplus* Can., and the human bot or torsalo fly, *Dermatobia hominis* (L. Jr.). No loss figures are available, but we know that the losses caused by these pests to hides, and to beef and milk production are tremendous. Mortality among calves may be as high as 70 percent in more heavily infested areas of Central America.

Until the advent of DDT and other chlorinated hydrocarbon insecticides, livestock producers relied entirely upon arsenical dips for tick control. In recent years these materials have not been responding well and specialists have expressed the belief that the cattle tick has developed some resistance to arsenicals. For the torsalo fly, no solution had ever been found to combat either the fly or its grub, which lives under the animal's hide.

In 1948 a U. S. Department of Agriculture entomologist went to Brazil under the auspices of the American International Association for Economic and Social Development to test several of the new insecticides and rotenone on the control of livestock pests. Several months after he had left Brazil, it was discovered that wherever applications of a 0.5-percent toxaphene emulsion concentrate had been continued for a period of five months, there was a noticeable decrease in the incidence of torsalo warbles. There was no experimental evidence to the effect that toxaphene was toxic to either the young grubs as they entered the hide or to the encysted older grubs, but it was the general belief that the residual toxaphene was killing off the flies and mosquitoes that serve as vectors for the eggs of the female Dermotobia.

On the basis of these developments, Point Four technicians in February, 1950, set up toxaphene-spray demonstrations in Nicaragua and Ecuador. They found that in 8 months, treated animals gained an average of 139 pounds more than the untreated. They also found that Dermatobia could be controlled satisfactorily by eliminating its dipterous vectors; at the same time ticks and several species of other miscellaneous flies were affected likewise.

Wherever this work has been demonstrated, enthusiasm reigns throughout livestock circles of Latin America. Producers, large and small both individually and collectively, have started campaigns. The Ministries of Agriculture of Costa Rica, Nicaragua, Panama, and Ecuador are developing their own services and lending support to cooperating agencies working to bring these pests under control. The success of this work has led to the development of a full-time regional project in Central America and northern South America. The entomologist assigned to the project has completed one year's work in Costa Rica and is now preparing to carry on similar work in Ecuador and the other countries. He has emphasized tick and torsalo control and has helped train native technicians, extension workers, and farmers in practical and safe methods of treating livestock for parasite control.

Point Four entomologists are now stationed in El Salvador, Nicaragua, Bolivia and the Dominican Republic, and will soon be sent to Ecuador, Peru, and Brazil. These men are being confronted with the varied insect problems of cotton, coffee, citrus, corn, tobacco, and other miscellaneous crops and livestock. They conduct research, train local assistants in the fundamentals of entomology and the use of insecticides, and carry on extension activities. They are accumulating a wealth of information on the local flora and fauna, which until now have been too little understood for even our own needs in the United States and still await further exploration in many fields. This cooperation is a challenging experience that is rapidly paying dividends in an improved agriculture at the same time that it is stimulating the interest of United States industry in exporting insecticides and spray and dusting equipment.

A move is now on to set up a regional project in Panama for introducing, propagating, and distributing parasites and predators of crop pests, especially pests that affect sugarcane, coffee, corn, cotton, coconuts, fruits, and vegetables. This would be a cooperative project involving the U. S. Department of Agriculture, the Panamanian Ministry of Agriculture, and the Technical Cooperation Administration. Considerable attention would also be given to developing cultural methods for insect control and to other practices that would tend to minimize the need for insecticides.

A laboratory established near the Panama Canal would serve as an advance post for the entire Western Hemisphere. It would reduce the probability that new insect pests would be introduced as a result of commerce through the Canal.

In the Eastern Hemisphere Point Four aid in the control of agricultural pests has been confined largely to an attack on the desert locust, *Schistocerca gregaria* (Forskal). Entomologists are now being recruited for India, Iran and Iraq for general entomological and extension work. Point Four entomologists are already on duty in Liberia and the Philippines.

A recent achievement, unprecedented in the long history of fighting the desert locust, clearly indicates how modern techniques can be applied successfully in the program of technical cooperation with other governments. Following a request from the Government of Iran in April 1951 for assistance in the Iranian anti-locust campaign, the United States quickly despatched by air 8 small spray planes, 10 tons of aldrin, 8 pilots, and 2 entomologists to the scene of activities in southern

(*Turn to Page* 113)

Pacific Slope Branch officers: (L to R) Leslie M. Smith, Univ. of California, Davis, secretary-treasurer; Glenn E. Carman, Univ. of California Citrus Experiment Station, Riverside, chairman; and Stanley F. Bailey, Univ. of California, Davis, vice-chairman.

Problems of Insect Pest Control Discussed as

Pacific Slope AAEE Meets

A BROAD portion of the field of entomology was covered in the meeting of the Pacific Branch of the American Association of Economic Entomologists held at Santa Barbara, Calif., June 23-26.

Dr. E. F. Knipling, assistant chief, Bureau of Entomology and Plant Quarantine, U.S.D.A., Washington, D. C., president of the A.A.-E.E., addressed the group. He discussed plans for consolidation between the A.A.E.E. and the Entomological Society of America, stating that the result should be a stronger organization for the advancement of entomology in the U. S. and encourage closer cooperation between entomologists working in the economic and systematic fields of the science.

A panel on biological control of insects discussed recent developments in this line and pointed out the beneficial effects of a "supervised control program" being used in California. This program makes use of natural factors plus cultural and chemical control methods, the speakers pointed out.

A second panel on "Factors Contributing to the Need for More Extension Entomologists" was included on the program. M. P. Jones, U.S.D.A. extension entomologist, Washington, D. C. declared that the field of extension entomology, though new, is spreading and developing rapidly. Some states, he reported, have as many as seven extension entomologists.

He reviewed the use of insecticides in the U. S., stating that the amount being used annually is ten times that employed a decade ago. Synthetic materials have extended the use of chemical to crops of lower value, and today DDT alone is being used in quantities greater than all insecticides of ten years ago. This upsurge of new materials has led to confusion, particularly in regard to trade names. In California alone, he pointed out, there are 9,500 insecticides registered. Such a picture makes liaison work between the extension entomologist and the county agent more and more important.

A discussion on the effect of pesticides on pollinating insects brought out the fact that there is a great difference in the way in which bees respond to chemicals in various

by

Charles H. Starker

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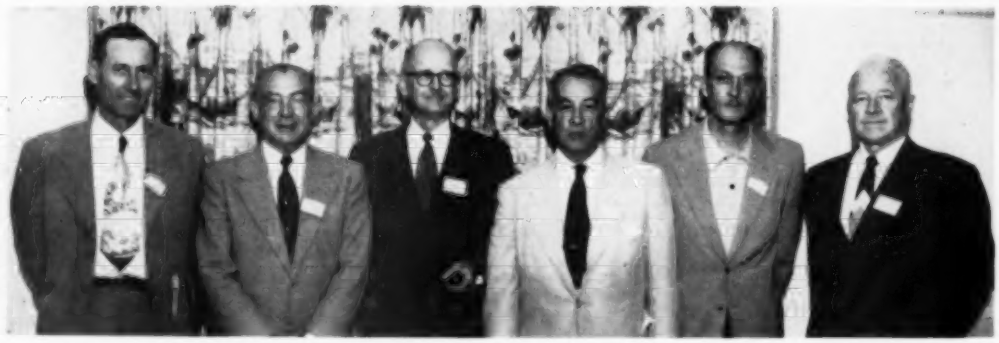


Photo above (L to R): Dr. E. F. Knipling, president, American Association of Economic Entomologists, USDA, Washington, D. C.; Dr. Roy E. Campbell, former A.A.E.E. president, Alhambra, Calif.; Dr. C. P. Clausen, U.S.D.A., Washington, D. C.; Ernest N. Cory, University of Maryland, College Park, Md.; A. C. Hodson, Univ. of Minnesota; and H. M. Armitage, San Francisco, California. Each took a prominent part in the Pacific Branch meeting.

areas. In Utah, it was noted, DDT can be used as a spray at a concentration of ½ pound per acre with no economic damage to bees; yet, when the Delta area was treated to "saturation," heavy mortality of bees resulted.

Dieldrin has given erratic results in several areas, it was reported. At Logan, Utah, large numbers of bees were killed for a period up to five days following application of the insecticide. Tests were run in another area at the same rate, but no significant number of dead bees were found in the treated over the untreated area. A number of workers from several western states reported "dis-orientation" or "re-orientation" of bees following application of insecticides, as a common occurence.

In California, the number one cause of bee mortality is the arsenicals and in second place, is parathion.

Recent developments in virus vector control were discussed by entomologists from a broad geographical area. H. M. Armitage, University of California, reported on work done on beet leafhopper and curly top of beets. The problem in California is critical, he said, but control can be effected by use of 1 pound of DDT in 2 gallons of oil per acre and applied to natural host plants of the vector.

E. W. Anthon, Washington State, told of cooperative work on stone fruit viruses with workers at the U.S.D.A. station in Utah. The studies included various vectors and means for their control, particularly in regard to Western "X" disease of peaches and little cherry.

Systemics Discussed

AN outstanding panel on systemic insecticides was held under the chairmanship of R. L. Metcalf, Citrus Experiment Station, Riverside, Calif. The surface has been barely scratched in the field of systemics, it was pointed out, and members of the panel predicted the eventual control of virus diseases by the protection of new growth not present when application of the systemic was made.

During the war, German scientists discovered that certain organic phosphorus and flourine compounds were insecticidal and systemic. Pest Control Ltd., Cambridge, England, investigated these materials further and discovered some of them were selective-destructive to sucking insects, but harmless to those insects which prey upon or parasitize other insects.

Dr. Arthur L. Abel, Pest Control Ltd., described the following means of application of systemic materials:

1) Foliar,—easy and fast, economical in use and dosage, and can be measured accurately. As the plant begins chemically to break down the systemic after it is absorbed, the period during which the plant remains toxic can be forecast very reliably.

2) Soil application, as in irrigation water. This has the advantage that it remains available to the plant for a long time, but the period governing the toxic effects within the plant is not so readily calculated as in foliar applications. In the latter case, the plant draws gradually upon the soil, removing toxic materials over a considerable period of time. Soil application does avoid the danger of spray drifts, and would be most suitable for flowers, ornamentals and similar crops, but has no place on vegetable crops. These must be completely free of all toxic residues by harvest time. In the case of other food crops, further research is needed before the soil application of systemics can be recommended. The effect of foliar or soil applications depends on the concentration of undecomposed systemic in the plant. There is some loss by evaporation or excretion on the leaf surface.

Dr. Abel reported that on the Gold Coast of West Africa, swollen shoot disease of cocoa is transmitted by the cocoa mealy bug. Control has been succesful through the use of a product containing bis dimethyl

amino fluorophosphine oxide and octamethyl pyrophosphoramide. A mortality rate of 99.95% was achieved, he said. The material was applied in capsule form to overcome the acute shortage of water. The capsulated toxicant is applied to the root zone, the dosage based in the weight of the tree, as correlated with the diameter of the trunk. The product made the tree toxic to mealy bugs for 8 weeks but left beneficial insects unharmed. The material itself was decomposed in the cocoa pod so that after harvesting and fermentation, no traces of the chemical are left in the cocoa beans.

It was pointed out that systemic insecticides have these advantages:

1. From any point at which they come into contact with the plant, they are carried to almost every other part; thus they reach and kill insects inside curled leaves which are inaccessible to contact sprays.

2. They are translocated to parts of the crop which were not there when the spraying took place; new foliage as well as old, becomes toxic. They keeps hops aphis-free while the plant grows.

3. Selective action of systemics spares predators. The selective insecticide kills a majority of harmful insects, leaving the tougher survivors to be mopped up by the unharmed predators. General contact insectides, applied in the conventional manner, do not distinguish between pest and predator or parasite.

International flavor enters Pacific Coast meeting with speakers discussing foreign problems in economic pest control studies

Robert J. Geary, Farbenfabriken-Bayer, Blue Point, N. Y., commented that selenium compounds are the best systemics, but the attitude of the Food and Drug Administration is not conducive to development of this type of systemics in the U. S. Research work has thus centered around materials more acceptable to FDA. "Systox" tends to go up and not down when applied to plants, he said, and residues in a plant will disappear rather slowly in cold weather. The theory of action of "Systox" is that it kills by fumigation —that the stomata give off toxic vapors killing insects close to leaves, but not affecting those farther away.

Roland M. Jefferson, University of California, Davis reported good results from the use of OMPA for control of aphis and red spiders on fields flowers. "Systox" was a promising material, too, he said. The two products performed well as both a soil and foliar application.

Speaking on the commercial development of systemic insecticides, J. M. Magner, Monsanto Chemical Co., St. Louis, Mo. told of a screening program with the use of cut stems and single leaves for tracer studies. The material is applied in sprays, dust and aerosols, similar to the manner in which non-systemic materials are evaluated, he said. Oral, dermal and gross toxicity tests are run on the product, but investigations are somewhat complicated by the necessity for running tests with the juices of treated plants.

When the material is sufficiently promising, production methods are studied, bio-assay and other analytical techniques perfected, then pilot plant production is set up in order to give wider distribution in the field.

Among other factors to be considered, are those of warning growers to use the product only on crops for which it is recommended; of running residue analyses made difficult because of having to check residue on forage, fruit, seeds, vegetables and by-products. Finally, he said, registrations and licensing are even tougher than all of the previous steps.

Photo below: Dr. E. F. Knipling, A.A.E.E. president, chats with Dr. E. Gordon Linsley, University of California, Berkeley, Calif., president of Entomological Society of America at Santa Barbara meeting. Right: Dr. E. J. Hambleton, entomologist, Research Development Division, Technical Collaboration Branch, Office of Foreign Agricultural Relations, U. S. Department of Agriculture, Washington, D. C. (Dr. Hambleton spoke on Point Four Program, See Pg. 37)

American Phytopathological Society Meets in September to discuss

FUNGICIDES

FEATURING papers on broad phases of plant disease control in fruits, vegetables and cereals, the American Phytopathological Society plans to hold its 44th meeting at Cornell University, Ithaca, N. Y., September 7-10. George L. McNew, managing director of Boyce Thompson Institute for Plant Research, Yonkers, N. Y., APS president, will be in charge of a council meeting on September 7 and also at a business meeting the next morning. Dr. S. E. A. McCallan, also of Boyce Thompson, is secretary of the A.P.S.

Three concurrent sessions are scheduled for Monday afternoon, including a symposium on disease resistance under the chairmanship of J. C. Walker; a joint session with the Mycological Society of America, with Joseph C. Gilman as chairman; and another section on fruit diseases, with Glen Ken Knight as chairman.

Of three concurrent sessions being held Monday night, two are symposia on plant parasitic nematodes and fungicides and chemotherapy, under the chairmanship of A. C. Tarjan and Paul E. Waggoner, respectively.

The former section on plant parasitic nematodes, will present the following authors, and their subjects:

D. J. Raski, University of California, Berkeley, California, "Methods of Detecting and Investigating Plant-Parasitic Nematodes."

G. Thorne, U. S. Department of Agriculture, Salt Lake City, Utah, "Representative Types of Plant Parasitic Nematodes and Their Identification."

G. Steiner, U. S. Department of Agriculture, Beltsville, Maryland, "Phenomena and Problems of the International Parasitism of Nematodes in Plants."

J. R. Christie, U. S. Department of Agriculture, Beltsville, Maryland, "Ectoparastic Nematodes of Plants."

C. W. McBeth, Shell Agricultural Laboratory, Modesto, California, "Methods of Assaying Nematicides,"

A. L. Taylor, U. S. Department of Agriculture, Beltsville, Maryland, "Progress and Prospect in the Chemical Control of Nematodes."

The latter session, on fungicides and chemotherapy, will feature the following authors and their papers:

M. B. Moore, and Charles R. Olien, Minnesota Agricultural Experiment Station, St. Paul, Minnesota, "Mercury Bichloride Solution as a Surface Disinfectant for Cereal Seeds."

Harold J. Miller, Pennsylvania Salt Mfg. Company, Philadelphia, Pennsylvania, "Control of Damping-Off Fungi with Halogen Substituted Nitrobenzenes."

J. G. Dickson, G. R. Grimm, and A. L. Hooker, University of Wisconsin, Madison, Wisconsin, "Stem Rust Control with Fungicides."

Paul E. Waggoner, Saul Rich, and J. G. Horsfall, Connecticut Agricultural Experiment Station, New Haven, Connecticut, "Prediction of Field Performance of Fungicides."

A. E. Diamond and P. E. Waggoner, Connecticut Agricultural Experiment Station, New Haven, Connecticut. "Biochemistry of the Lycomarasmin-Iron Chelated Complex."

E. M. Stoddard, Connecticut Agricultural Experiment Station, New Haven, Connecticut, "Chemotherapeutic Control of Phizoctonia on Greenhouse Stock."

David Davis, Connecticut Agricultural Experiment Station, New Haven, Connecticut, "Inducing Disease Resistance with Plant Growth-Regulators," and "Chemotherapy of Tobacco Mosaic Virus."

The other concurrent session of Monday evening will be a section on fungus physiology, with H. L. Barnett as chairman. Nine papers are scheduled to be presented in this section.

Fungicide colloquium expected to be of particular interest to the trade. New products, reports on others scheduled

Tuesday morning's program will also have three concurrent sessions, as follows: Section A, virology, with A. Frank Ross as chairman; Section B, fungicidal action, with Carroll E. Cox, chairman; and Section C, on nematology with W. F. Mai in charge.

Eleven papers will be presented at the virology section and a total of ten at the session on fungicidal action. The authors and their topics at the latter session, will be as follows:

O. D. Morgan, Jr., University of Maryland, College Park, Maryland, "Some Effects of Eight Fungicides on Growth of *Sclerotinia fructicola*, *Glomerella cingulata*, and *Penicillium expansum*."

Norton L. Marshall and Carroll E. Cox, University of Maryland, College Park, Maryland, "The Comparative Effects of Tribasic Copper Sulfate and of Ziram on *Colletotrichum phomoides* in Culture."

H. D. Sisler and C. E. Cox, University of Maryland, College Park, Maryland, "Effect of Tetramethylthiuram Disulfide on Anaerobic Breakdown of Glucose by Fungi."

Saul Rich and James G. Horsfall, The Connecticut Agricultural Experiment Station, New Haven, Connecticut, "Tolerance of a Black Fungus to Phenols and Quinones."

H. C. Palmer, R. W. Greenlee, and M. M. Baldwin, Battelle Memorial Institute, Columbus, Ohio, "Fungicidal Action of Sodium Dialkydithiocarbamates."

C. E. Yarwood and Louis Jacobson, University of California, Berkeley, California, "Fungicidal Action Due to Selective Toxicity and Selective Absorption."

Lawrence P. Miller, and S. E. A. McCallan, Boyce Thompson Institute for Plant Research, Inc., Yonkers, New York, "True Dosage Received by Fungus Spores Treated with Labeled 2-Heptadecyl-2-Imidazoline."

Richard M. Weed, S. E. A. McCallan, and Lawrence P. Miller, Boyce Thompson Institute, "Breakdown of Various Organic Sulfur Fungicides to Yield Carbon Disulfide and Its Significance in Their Toxic Action."

Robert C. Owens, Boyce Thompson Institute, "Chemical Constitution of Quinones in Relation to Amlase Inhibition and Fungitoxicity," and "Sport Uptake of Fungitoxicants Assayed by Amylase Inhibition."

A symposium on the physiology of parasitism will be held on Tuesday afternoon, under the chairmanship of J. P. Hollis. This will be one of three concurrent sessions, the other two being a joint session with the Potato Association of America, with G. H. Rieman as chairman; and a third, on cereal diseases, with Thor Kommedahl in charge.

The phytopath banquet will be held at 6 p.m. Tuesday.

Colloquium Tuesday Night

THE Fungicide Colloquim, always well-attended by industry representatives, will be under the chairmanship of Dr. L. Gordon Utter, Phelps Dodge Refining Corp., New York. The following speakers, and their topics, are scheduled to be heard at this session:

Lea S. Hitchener, executive secretary and treasurer, National Agricultural Chemicals Association, Washington, D. C., will talk on the current status of legislation and control of pesticides, preceeding a panel on "Use of Fungicides Outside the United States."

Appearing on this program will be N. C. Thornton, Tela Railroad Co., Ltd., Lima, Honduras, who will talk on Central and South America; L. R. Reed, Plant Protection, Ltd., Fernhurst, England, on "Europe", Sheodhan Singh and Syed Ali, University of Minnesota, St. Paul, "Asia."

E. A. Walker, U.S.D.A., will speak on the "Program of the Production and Marketing Administration for Testing of Fungicides"; W. A. MacLinn, N. J. Agricultural Experiment Station, New Brunswick, "Taste Panel Studies on Fungicides"; J. B. Harry, Carbide & Carbon Chemicals Co., New York and M. T. Hilborn, Maine Agricultural Experiment Station, Orono, "Manufacturers' and Applicators' Problems of Formulation"; E. C. Stakman, University of Minnesota, St. Paul, "Chemical Control of Wheat Rust"; and Dr. McNew, "Report of Work of Food Protection Committee of the National Research Council."

At the conclusion of the colloquium, industry representatives will present new fungical products being placed on the market or which have undergone preliminary investigation.

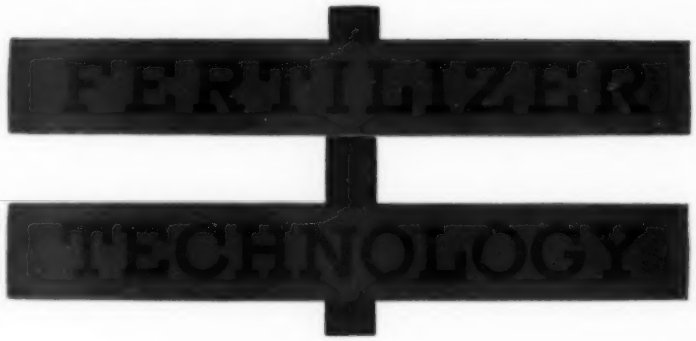
While the colloquium is under way, a concurrent session on forestry diseases will be held with W. H. Bragonier as chairman.

A full day's program is scheduled for Wednesday, September 10, beginning with a business meeting of the American Phytopathological Society at 9 a.m., with Dr. McNew in charge.

The technical portion of the program will be in three sections: a symposium on antibiotics, with David Gottlieb as chairman; one on oak wilt with A. J. Riker as chairman and a round table discussion on legume viruses, with K. W. Kreitlow as chairman. At noon the extension plant pathologists will hold a luncheon at which L. O. Weaver will preside in a general discussion.

Wednesday afternoon's program consists of a joint session with the Mycological Society of America on fungus genetics, H. N. Hansen, chairman; a section on vegetable diseases, L. J. Alexander, chairman; another section on field and forage crop disease, K. W. Kreitlow, chairman; and a joint session with the American Society for Horticultural Science on stone fruit virus diseases. Damon Boynton and L. C. Cochran will be chairmen.

American Chemical Society's Fall Meeting includes Section on



THE Division of Fertilizer and Soil Chemistry will present a number of technical papers at the 122nd national meeting of the American Chemical Society in Atlantic City, N. J., September 14-19. Dr. S. F. Thornton, F. S. Royster Guano Co., Norfolk, Va., is chairman of the Division, and J. D. Romaine, American Potash Institute, Washington, D. C., secretary.

According to the advance program, Dr. F. E. Bear, Rutgers University, New Brunswick, N. J., will preside at the opening session of the Division on Wednesday afternoon, September 17; a symposium on potential of fertilizer use for more efficient crop production. Following Dr. Bear's introductory remarks, a paper by A. L. Mehring, J. R. Adams and G. A. Bennett, "Fertilizer Expenditures in Relation to Income in Various States" will be presented. The following authors will present these papers:

Mack Drake, "Potential of Fertilizer Use for More Efficient Crop Production As Applied to the Northeastern Region"; K. C. Berger, "Potential of Fertilizer Use for More Efficient Crop Production As Applied to the Middle West"; James A. Naftel, "Potential of Fertilizer Use for More Efficient Crop Production As Applied to the Humid South"; and John P. Conrad, "Potential of Fertilizer Use for More Efficient Crop Production As Applied to the Western States."

Next morning, September 18, Dr. Thornton will preside at a session on fertilizer technology. Authors scheduled to present papers, and their subjects, are listed as follows:

F. L. Turbett and J. G. Mac Arthur, "Chemical and Physical Properties of Ammoniated Superphosphate"; Louis E. Andres, "The Prevention of Reversion of P_2O_5 in Calcium Phosphate and Its Application to the Manufacture of Fertilizers in an Alkaline Medium"; L. D. Yates, F. T. Nielson, E. J. Fox, and R. M. Magness, "Superphosphates by Acidulation of Rock Phosphate with Mixtures of Sulfuric and Phosphoric Acids and with Phosphoric Acid Alone"; David Mc Knight, J. F. Anderson, Jr., M. M. Striplin, Jr., and T. P. Hignett, "Partial Replacement of Sulfuric Acid with Nitric Acid in Making Superphosphate," and G. L. Bridger and D. R. Boylan, "Fertilizer by Fusion of Rock Phosphate with Magnesium and Potassium Sulfates."

In the afternoon, A. L. Mehring will preside at a session on fertilizer technology. On this program, the following speakers and their subjects are scheduled:

A. B. Pettit, "Scrubbing Systems for Fluorides in Superphosphate Plants"; M. H. Pickard, "Mining and Processing of Borates in California"; W. H. Mac Intire and T. B. Stansel, "Steam Catalysis in Expediting Fluocalcination of Dolomite and Limestone Fines at Lower Temperatures"; G. L. Bridger and J. W. Markey, "Determination of Source and Distribution of P_2O_5 in Triple Superphosphate by Radioactive Phosphoric Acid"; and W. A. Morgan and R. D

Meeting Dates of Fertilizer Section, Sept. 17-19. ACS Convention proper, begins on September 14

tion of Available Plant Nutrients, Fertilizer Applications, and Plant Tissue Analyses to the Composition of Tomato Puree[?]; F. T. Tremblay and K. E. Baur, "The Effect of Solubility of Phosphate Fertilizers on the Yield of Vegetable Crops"; and R. L. Isaacs, Jr., and J. B. Hester, "Foliar Applications of Plant Nutrients to Vegetable Crops."

The Division of Agricultural and Food Chemistry will conduct several other symposia, including one on the formation and action of weed killers under the chairmanship of Professor Alden Springer Crafts of the University of California Department of Botany.

"Special Dietary Foods" will be the subject of another, led by Dr. James R. Wilson, secretary of the Council on Foods and Nutrition of the American Medical Association.

Joint symposia will be held by the Agriculture and Food Division with the Division of Chemical Literature on "The Literature of Food Chemistry," under the chairmanship of Earl D. Stewart, chief chemist of Schwartz Laboratories, Inc., New York; with the Division of Sugar Chemistry on the production of sugars by microorganisms, under the direction of Dr. L. A. Underkofler of Iowa State College; and with the Division of Colloid Chemistry on "The Natural Plant Hydrocolloids," with Leonard Stoloff and Z. E. Keretsz in charge.

A highlight of the ACS meeting will be the presentation of the Society's Priestley Medal, highest honor in American chemistry, to Dr. Samuel Colville Lind of the Carbide and Carbon Chemicals Company staff at the Oak Ridge (Tenn.) National Laboratory. Dr. Lind, internationally known for his research on radium and radioactivity, will receive the medal at a general assembly of the Society on Monday night, September 15, at the Atlantic City Convention Hall. He is a past president of the Society and dean emeritus of the University of Minnesota Institute of Technology.★★

Kralovec, "Chemical Method for Available Fertilizer Nitrogen in Urea-Formaldehyde Compositions."

Friday morning's program, the last of the meeting, will be under the chairmanship of Dr. Thornton in a "General Session." Results obtained in a 4-year lysimeter study will be discussed in a paper by W. H. MacIntire, W. M. Shaw and J. B. Young, "Reactivities Between Magnesic Minerals and Soils."

Donald H. Smith, James M. Blume and Colin W. Whittaker are co-authors of a paper, "Radio-Chemical Measurement of Reaction Rates of Liming Materials in Soil," to appear next on the program, and the following papers will conclude the fertilizer portion of the ACS program:

P. P. Chichilo, W. H. Armiger, A. W. Specht, and C. W. Whittaker, "Influence of Limestone and of Blast-Furnace Slag on Chemical Composition and Yield of Sweet Clover and on Soil pH"; J. B. Hester, R. L. Isaacs, Jr., and F. A. Shelton, "Rela-

Atlantic City convention hall to be scene of 122nd national meeting of Society. Reports of many studies scheduled to be heard and information on manufacture of superphosphate with minimum sulfuric acid. Results of radioactive tests in plant nutrition also on agenda for discussion. Fertilizer subjects in the spotlight for three full days.

National Shade Tree Conference to study problems involved in

Chemical Control of Pests

PROGRAM plans for the twenty-eighth National Shade Tree Conference have been announced by the group. The meeting is scheduled to be held at the Hotel Statler, Boston, Mass., August 18-22. Commercial exhibits are to be shown, and a full program of technical papers, symposia, a banquet and demonstrations of equipment are planned.

NSTC president Noel B. Wysong will preside at the opening session on August 19, with the following speakers scheduled to appear: Earl L. Smith, director of advisory dept., Babson's Reports, Inc., Wellesley Hills, Mass., "Business Trends and What They Indicate for the Future"; and Prof. Gordon S. King, University of Massachusetts, Amherst, "Training Qualified Arborists."

A business meeting will follow, and reports will be heard from L. C. Chadwick, NSTC secretary-treasurer; and Paul E. Tilford, editor and chairman of the budget committee.

"'Krilium' — Its Use in Arboriculture" will be discussed by W. P. Martin, department of agronomy, Ohio State University, Columbus, Ohio, and a plant clinic will be in charge of Dr. Spencer H. Davis, department of plant pathology, New Jersey Agricultural Experiment Station, New Brunswick, N. J.

A dinner meeting of the National Arborist Association will be held that evening, with a session following on Municipal Arboriculture and Forestry. Discussion leader will be Harry E. Turner, secretary, shade tree commission, East Orange, N. J.

Edward W. Higgins, past president of the National Shade Tree Conference, will preside at the meeting of Wednesday, Aug. 20. Dr. William W. Cantelo, Bartlett Tree Research Laboratories, Stamford, Conn., will talk on "Birch Leaf Miner and Its Control"; Dr. Frank E. Egler, consulting vegetationist, Aton Forest, Norfolk, Conn., "Roadside Brush Control — An Application of Plant-Community Management."

The afternoon of Wednesday will be devoted to a New England clam bake, tree climbing contest, swimming, boating and games.

Dr. Wysong will be in charge of Thursday morning's session, which will include reports by Dr. Curtis May, U.S.D.A., Beltsville, Md.; R. K. Alman, Oscar Warner, Norman Armstrong, Karl Kuemmerling and Edward H. Scanlon.

An educational session will be under the direction of Dr. George Langford, vice-president. "Some New England Insects and Diseases of Shade Trees and Their Control" will be the subject of a discussion led by Dr. Malcolm A. McKenzie, director, Shade Tree Laboratories, University of Massachusetts, Amherst. Others taking part in the discussion will include Dr. David H. Marsden; Dr. Philip L. Rusden; and Prof. William E. Tomlinson, all of Shade Tree Laboratories, University of Massachusetts, Amherst.

A study of Dutch Elm disease will occupy a prominent spot in the program of Thursday afternoon when the topic, "Living With the Dutch Elm Disease" is discussed by A. W. Hurford, secretary and forester, Connecticut Forest and Park Association, New Haven, and Edgar G. Rex, State Department of Agriculture, Trenton, N. J.

The annual banquet will be held that evening, followed by dancing in the ballroom.

Friday's session will taper off with a trip to the Arnold Arboretum, said to have one of the world's most famous plant collections. En route, the group will visit the site of radio transmitter WHDH where brush control has been under way for a number of years. Frank E. Egler will be in charge of this phase of the program.

Business sessions scheduled for the meeting include an election of officers and the choice of a convention site for 1953.

Grasslands Congress Expected to Attract World-Wide Attendance

REGISTRANTS from all parts of the western world are expected to attend the Sixth International Grassland Congress at Pennsylvania State College, State College, Pa., August 25-30.

Although detailed program plans were not yet available at press time, the broad outline of general subjects to be covered, indicated a well-rounded agenda.

Numerous sections of the program will cover the entire scope of grassland improvement, including fertilization, the control of insect pests and diseases, and seed protection.

According to Dr. S. M. Raleigh, professor of agronomy at Pennsylvania State College, sections of the program will include genetics and breeding, improvement and management of pastures, meadows and turf, ecology and physiology of grasslands, soil management and fertilization, seed production and distribution, machinery, etc.

Joint sessions are also planned. These will include a session on weed and insect control in forage production; the harvesting and processing of forage seed; and machinery for applying fertilizer materials.

Opening sessions are planned for 9:30 Monday morning, August 25, with technical papers being presented in the afternoon and a general field tour scheduled to be held from 2-5 p. m. An official reception is on the agenda for Monday evening.

A similar schedule is arranged for Tuesday, with a plenary session taking place in the morning. Wednesday's program consists largely of a grassland field day covering both morning and afternoon periods. A dance Friday night will provide recreation for the delegates and Saturday's session will comprise sectional meetings in the morning with a summary session taking place in the afternoon. No evening program is planned for Saturday, the last day of the meeting.

Dr. Raleigh stated that prominent speakers were being solicited but at press time some had not accepted definitely. Among these was president Harry S. Truman who been invited to address the group at one of the sessions.

The grassland congress has attracted world-wide interest, as is attested by the considerable number of out-of-the-country delegates scheduled to be present at the week-long event.

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Ethyl Personnel Changes

Ethyl Corporation, New York, has appointed Matthew A. Taylor manager of sales operations, according to an announcement by Malcolm P. Murdock, general sales manager.

The corporation has also named Donald S. Flynn and George P. Rosser as assistant managers of the eastern region. Mr. Flynn's headquarters will be in New York and Mr. Rosser's in Pittsburgh.

Other advancements announced are those of William K. McCulloch, sales promotion manager, to assistant manager of the advertising and sales promotion department, and Donald J. Chapman, account representative in the Western region, to sales promotion manager.

Under the re-organization of the advertising and sales promotion department, of which Russell B. Westin is manager, Frank A. Howard, Jr. will be in charge of advertising, and Edwin J. Enoch, Jr. will continue to be in charge of advertising and sales promotion production.

Another change announced by Mr. Murdock is the creation of district managerships, in place of resident managerships, throughout the four sales regions. Appointments to district managers are:

Eastern region: Roy L. Goltz, New York City; Robert W. Richardson, Philadelphia.

Central region: Harry A. Mack, Dayton; George W. Rose, Chicago; Robert R. Mead, Kansas City, Mo.

Southern region: Leonard L. Huxtable, Tulsa; Russell Schell, Dallas; J. O. Balzer, Houston; Alan C. Tully, Baton Rouge.

Western region: Monroe F. Weill, Los Angeles; William H. Sievert, San Francisco; John S. Cole, Salt Lake City.

In addition, Gelston Howell, account representative in Western Pennsylvania, has been transferred to the New York office of the Eastern region.

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NFA Contacts Bankers

The National Fertilizer Association, Washington, D. C., has announced a program designed to furnish the banks of America, particularly rural banks, with information needed by these institutions in considering farm production loans involving the purchase of fertilizers.

Dr. Russell Coleman, NFA president, states that if farmers are to purchase additional amounts of fertilizers required to grow more and more crops in accordance with goals set by the U. S. Department of Agriculture, a greater outlay of capital will be required. "On the basis of present production costs, farmers by 1955 will need about $700 million more working capital for fertilizers alone, than was used in 1950," he said. "Private banks should be made aware of this prospective increase," the NFA head declared.

Increasing Use of Plant Food is seen by speakers appearing at Northwest Fertilizer Conference

THE third regional fertilizer conference was held in Pocatello, Idaho, July 9-11, with speakers representing various sections of the country appearing on the program.

Dr. K. D. Jacob, head, Division of Fertilizer and Agricultural Lime, U.S.D.A., Beltsville, Md., reviewed fertilizer usage in the northwest, pointing out that new consumption records are being set each year by growers in this area. He reported that last year the 12 western states used phosphate fertilizer containing a total of 137,000 tons of available P_2O_5 with an estimated delivered-to-the-farm value of more than 23 million dollars. "This was a new record for consumption of phosphate in the western states and was four times the quantity used in 1939. The phosphate fertilizer was produced mostly from phosphate rock mined in Idaho, Montana, Utah, and Wyoming, and processed in plants located in the western states and British Columbia," he said.

"Estimates of the quantities of phosphate needed for the level and pattern of agricultural production attainable in the various states in 1955 were recently made in a survey by the Land Grant Colleges and the U. S. Department of Agriculture. The total need for the 12 western states is estimated to be 209,000 tons of available P_2O_5, or 52 percent more than the consumption in 1951 and 6.5 times the consumption in 1939.

"The greatly-accelerated increase in consumption of phosphate and other fertilizers in recent years was influenced, among other factors, by (1) the urgent need for additional food and fiber to meet the domestic and export needs, (2) the greatly improved economic position of the farmer, (3) the continued decline in the native fertility of large areas of the nation's soils, and (4) a more general recognition of the potentialities of fertilizers will undoubtedly continue to be markedly influenced by these factors."

Dr. Jacob continued: "The importance of fertilizer to agriculture and the public is indicated by the proportion of the total crop production that results from the use of fertilizer. For the United States as a whole, it is estimated that this proportion was nearly 14.5 percent in 1938 and 22 percent in 1948. It appears that in 1951, the proportion may have been as high as 25 percent. Fertilizer also makes a major contri-

Below: At the Pocatello Fertilizer Conference. At left is John R. Taylor, Jr., American Plant Food Council, Inc., Washington, D. C., who spoke to the group.

Above: (L to R) B. "Rod" Bertramson, chairman, Dept. of Agronomy, Washington State College; G. O. Baker, Univ. of Idaho; F. Todd Tremblay, Puyallup, Washington and Lyman Judson, Lynden, Washington.

bution to the maintenance and improvement of soil fertility, and its use is a major factor in successful programs of soil erosion control and water conservation.

"There is an increasing volume of evidence that water-soluble phosphates are usually more efficient sources of phosphorus for crops on alkaline soils, such as predominate in the west, than are those in which all or a major portion of the P_2O_5 is insoluble in water but is soluble in neutral ammonium citrate solution. Super-phosphate and the other phosphate fertilizer materials produced in the west contain P_2O_5 mostly in water-soluble condition. Ammoniation of superphosphate—either alone or in mixed fertilizers—results, however, in the conversion of much of the available P_2O_5 into water-insoluble forms. In view of this situation, the fertilizer control officials of the western states might well consider requiring that phosphate fertilizers be guaranteed with respect to both water-soluble and available P_2O_5.

"Plants in western United States and Canada for producing chemically processed phosphate fertilizers comprise 16 facilities, chiefly for manufacture of normal and triple superphosphates and ammonium phosphates. The total capacity of these facilities is estimated to be equivalent to 280,000 tons of available P_2O_5 per year. Nearly all of this capacity is in plants that process phosphate rock with the aid of sulfuric acid," Dr. Jacob reported.

"Fertilizer and Soil Moisture Relationships as They Influence Yield and Quality of Crops" was the title of a paper presented by Dr. Jay L. Haddock, soil scientist, Soils, Fertilizer and Irrigation Agriculture Division of the U.S.D.A., Logan, Utah. He emphasized that the application of fertilizer may increase both the quantity and quality of crops, but it may also increase quantity and decrease the quality of crops. He said that both the fertilizer industry and the users of its products should understand the relationships of fertile soil, adequate soil moisture and a "useful and profitable crop."

"Irrigation practice has a marked influence on the uptake of phosphorus and nitrogen," Dr. Haddock said. "Phosphorus deficiency is accentuated by dry soils and those containing large quantities of available nitrogen; nitrogen deficiency is aggravated by heavy irrigation. Frequently crop value is depressed quite as much by excess as a deficiency of nitrogen."

Terming as "somewhat untrue" the statement that no commercial fertilizer can compare with barnyard manure as a fertilizer," he declared that barnyard manure is of unquestioned value, but its value lies "quite as much in its physical effect as its fertilizer effect. It is frequently much less effective as a fertilizer than commercial materials."

Hay Needs Fertilizer

RULON D. Lewis, U.S.D.A., Laramie, Wyoming, reported on investigation of the fertility requirements of mountain meadows in that state. He said that the average yield of natural meadow hay is 0.7 tons per acre on the more than 500,000 acres of hay in the state. This is a considerable decrease from the 2 to3 tons of hay per acre reported by early pioneers, and indicates an unfavorable soil - plant - water - relationship. Plant species have changed high grade grass and legumes to rushes and sedge type vegetation. This change in quality and quantity of the forage produced on much of the land has deteriorated to the extent that the very existence of the livestock industry is threatened. Increased yield of high quality hay is essential to the continuance of this industry. This is particularly true because of the short growing season, long winters, and other problems.

"For the last two years, research has been conducted cooperatively by the Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. D. A., and Wyoming ex-

(*Turn to Page* 103)

Pennsalt Operates New Facilities in Alabama . . . Emulsifiable Concentrates of DDT-BHC-Toxaphene from

NEW INSECTICIDE PLANT

PENNSYLVANIA Salt Manufacturing Company announces that it has taken another step toward more complete pesticide service for southeastern farmers in the addition of facilities to produce emulsion concentrate formulations at its Montgomery, Ala., plant.

This Plant, started by Pennsalt early in 1951, is one of the most modern dust-base formulating operations in the southeast, embodying several new formulating techniques developed by Pennsalt.

The growth in demand for emulsion concentrates for liquid formulations in recent years reached the point where Pennsalt has found it economically practical to add these facilities at Montgomery, the company says. Previously, supplies of these pesticides for this area had been supplied from Pennsalt's works at Natrona, Pa.

The new facilities are producing emulsifiable concentrates of benzene hexachlorde, DDT, toxaphene and BHC-DDT combinations, principally for cotton but also for other crops of the area. These products thus round out Pennsalt's line of pesticides which formerly included dust-base formulations of DDT, BHC, toxaphene, sulfur, parathion and other active ingredients.

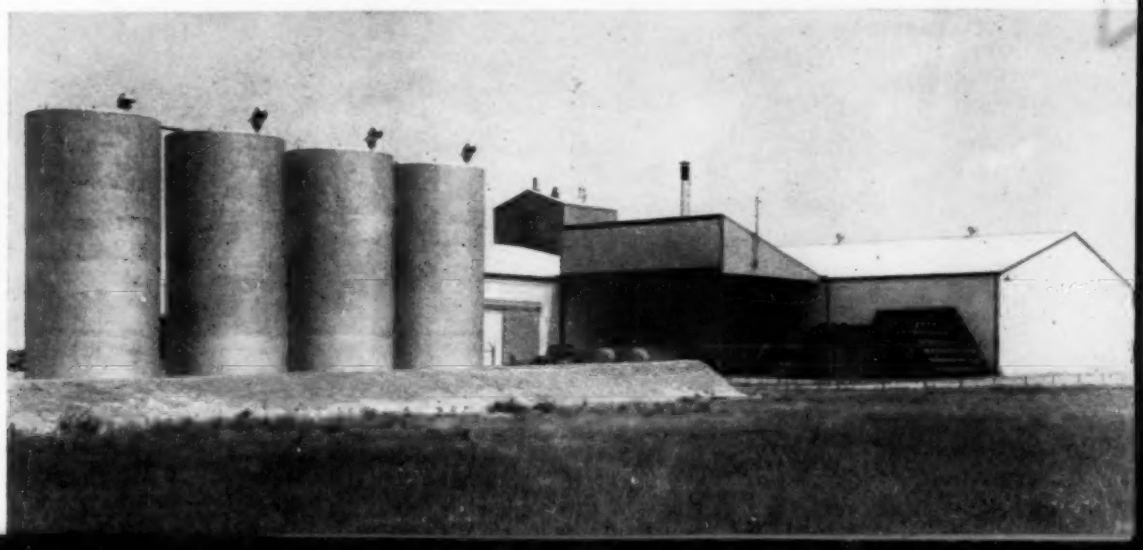
The new facilities include blending and mixing tanks and apparatus, chiefly of copper and monel construction, and weighing and conveying equipment, plus the usual process controls. Four solvent storage tanks with a capacity of 60,000 gallons have been installed. Warehousing space has been increased 35 percent and additional truck loading facilities have been included.

General contractor for the addition was Bear Bros., Inc., of Montgomery, contractors for the original installation.

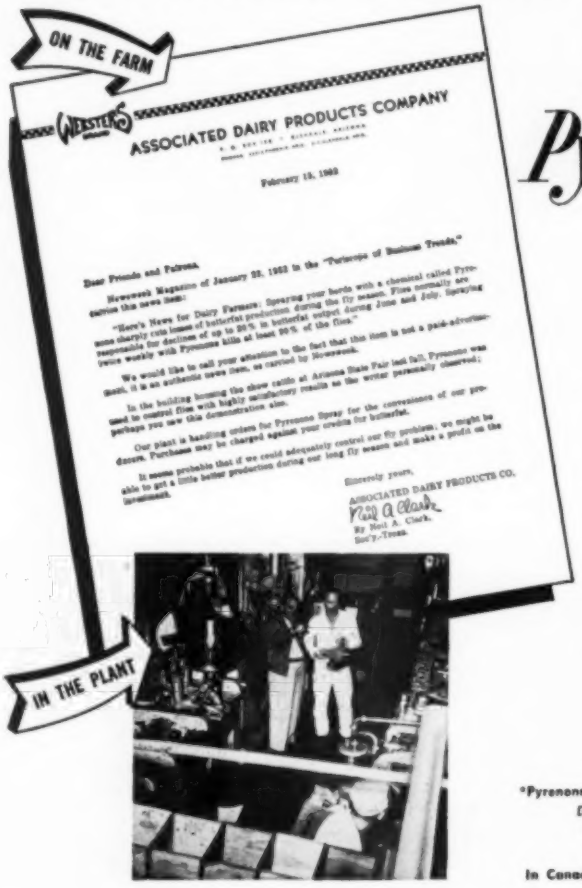
(Right): Finished insecticide emulsion concentrates are loaded on containers in this outdoor filling station and can be conveyed readily either to adjacent truck platform or storage space.

(Right): General view of new manufacturing facilities at Montgomery, Alabama, for production of dusts and emulsion concentrates. Outside location presents better operating conditions, the company says.

(Below): Over-all, rear view of expanded facilities. The four vertical tanks are used for storing raw material solvents. Each tank holds 15,000 gallons. Southern climate is favorable to out-of-door manufacturing facilities, part of which can be seen in rear.



PROTECTING MILK from farm to family with Pyrenone* sprays


ON THE FARM
ASSOCIATED DAIRY PRODUCTS COMPANY
February 15, 1952
Dear Friends and Patrons,
However Magazine of January 28, 1952 in the "Periscope of Business Trends,"
carries this news item:
"Here's News for Dairy Farmers: Spraying your herds with a chemical called Pyrenone cuts losses of butterfat production during the fly season. Flies normally are responsible for declines of up to 20% in butterfat output during June and July. Spraying twice weekly with Pyrenone kills at least 90% of the flies."
We would like to call your attention to the fact that this item is not a paid-advertisement, it is an authentic news item, as carried by Newsweek.
In the building housing the show cattle at Arizona State Fair last fall, Pyrenone was used to control flies with highly satisfactory results as the writer personally observed; perhaps you saw this demonstration also.
Our plant is handling orders for Pyrenone Spray for the convenience of our producers. Purchases may be charged against your credits for butterfat.
It seems probable that if we could adequately control our fly problem, we might be able to get a little better production during our long fly season and make a profit on the investment.
Sincerely yours,
ASSOCIATED DAIRY PRODUCTS CO.
By Neil A. Clark
Sec'y.-Treas.
IN THE PLANT

Pyrenone* insecticides are formulated by manufacturers to meet specialized requirements — aerosols, emulsifiable sprays, powders, oil-base sprays, dusts. Properly formulated and applied, Pyrenone presents no hazard to spray operators, dairy employees, milk plant employees, or to milk or milk products. Specify Pyrenone sprays for your pest control requirements.

Pyrenone*

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Branches in Principal Cities.
In Canada: Natural Products Corporation, Montreal and Toronto

Washington Report

THE sulfur shortage is a subject about which there seems to be general disagreement in Washington these days. The daily and trade press, toward the end of July, was filled with statements by responsible officials of leading sulfur companies indicating that sulfur was now in balance. On the other hand, warnings continue to come out of Washington about the continuing shortage of sulfur.

The effect of a slight business recession, plus the slackening of demand due to the steel strike has made sulfuric acid and other sulfur-bearing chemicals in long supply for the first time in many months. However, official Washington must operate on the theory there will be a continuing sulfur shortage up until 1955, at which time additional production facilities now under way will have attained their maximum production.

This problem is also affecting the pesticide industry. The Chemicals Division of NPA and the Department of Agriculture are exploring the possibilities of a cutback in the amount of sulfur to be made available for pesticidal use. This cutback is receiving serious consideration because of the alleged shortage of superphosphate which is due primarily to an inadequate amount of sulfur that can be diverted for this purpose. Since agriculture is the claimant for both of these materials, it is up to this claimant agency to make the decision as to where the primary emphasis is to be placed in the sulfur allocation.

Some responsible government officials have pointed out that if the pesticidal base of 1950 is used as is provided for by Order M-69, pesticidal requirements for the entire U. S. will be met by a figure not exceeding 55% of the amount of sulfur that was used by the pesticide industry during 1950. On the other hand, it has been shown that the actual amounts of material that were made available during the past agricultural season amounted to well over 125% of the amount of sulfur allocated during the base period. Therefore, it has been shown that somewhere around 80-90,000 tons of sulfur could be saved by cutting back to this 55% figure of the base year. This would represent about 250,000 tons of sulfuric acid which could be utilized to produce slightly less than a million additional tons of superphosphate.

If this type of program is finally adopted, it will mean that there will be a cutback in the amount of sulfur that can be made available for pesticidal use. Most industry spokesmen contacted on this matter felt that due to the heavy accumulation of heavy inventories of sulfur prior to October 1951, and lack of the use of sulfur during the 1951-52 season due to small infestations, the industry was not taking all of the allocation of sulfur to which it was entitled. However, they feel that there will be an acute shortage of sulfur for the agricultural year beginning October 1, 1952 if this type of program is adopted.

* * *

NPA, the Department of Agriculture, and OIT were in a series of hectic conferences and discussions at the end of July to determine the additional amount of sulfur-bearing cotton dusts which could be made available for export during the 3rd and 4th quarters of 1952. Unofficial estimates had indicated that during the first 6 months of 1952, approximately 100 million lbs. of sulfur-bearing dusts had been allocated for export during this period. For purposes of statistics, it is assumed that 75% of the amount of material allocated, represented sulfur-bearing cotton dusts.

Many industry spokesmen feel that the above figures are not accurate since there is quite a lag between the amount of materials approved for export and those which were actually exported. The so-called "rate of attrition" is estimated by many industry spokesmen to be somewhere between 75% and 80%, which means in effect that of the 100 million lbs. of material allocated, perhaps as much as 75% to 80% actually did not leave the country for one reason or another.

Since the rate of non-shipments is not available, the Department of Agriculture and NPA are reluctant to approve any additional quantities until this matter has been clarified. However, OIT is insistent that these additional amounts be allocated for the 3rd and 4th quarter since it is their job to satisfy requirements of our foreign friends. Certainly, it has been pointed out by many industry people, that if we are going to have controls, we should have the statistics and the necessary regulation of these controls in order to know at all times exactly what has been allocated and what has been shipped.

* * *

Pesticide Formulators' Industry Advisory Committee was formed in July by the Chemicals Division of NPA to assist in the solution of problems affecting formulators of pesticidal formulations. The first problem with which this industry group was asked to cope was relating to the sufficiency of sulfur for the pesticidal industry as well as the amount of sulfur-bearing dusts which could be exported. The group itself consisted of 17 people who were representative of many of the important factor in the pesticidal formulating group of the industry. They are as follows:

W. Mercer Rowe, Jr., Ashcraft-Wilkinson Co., Atlanta, Ga.; C. F. Leonard, Virginia-Carolina Chemical Corp., Richmond, Va.; W. J. Liipfert, Woolfolk Chemical Works, Ltd., Fort Valley, Georgia; R. W. Jones, Triangle Chemical Company, Macon, Georgia; John Paul Jones, Stauffer Chemical Company, New York, N. Y.; W. F. Johnson, Chapman Chemical Company, Memphis, Tenn.; H. J. Grady, California Spray Chemicals Corp., Richmond, California; Wallace Durham, Durham Chemical Company, Los Angeles, California; E. D. Cooley, J. W. Quinn Drug & Chemical Co., Inc., Greenwood, Miss.; Thomas B. Sammons, Jr., Hays-Sammons Chemical Company, Mission, Texas; John Stoddard, John Powell & Company, Inc., New York, N. Y.; J. M. Taylor, Taylor Chemical Company, Aberdeen, North Carolina; R. W. Thatcher, Grasselli Chemicals Dept., E. I. du Pont de Nemours & Company, Wilmington, Delaware; M. C. Van

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Horn, Florida Agricultural Supply Company, Jacksonville, Florida; J. V. Vernon, Niagara Chemical Division, Food Machinery and Chemical Corp., Middleport, New York; B. P. Webster, Chipman Chemical Company, Inc., Bound Brook, New Jersey; and Robert J. Zipse, Geigy Company, Inc., New York, N. Y.

The initial meeting was held on July 15th at which the matter of consumption of sulfur for domestic agricultural purposes and for overseas agricultural purposes was discussed, and the recommendation was made by the industry group that no change be made in the allocation of material to be made available for pesticidal use under the provision of M-69. However, as was pointed out in a previous item in this column, some drastic action must be taken to fit the supply of sulfur to the demand, if the shortage actually exists as indicated by government spokesmen.

The government position is that the pesticidal industry did not take all of the sulfur to which it was entitled in the agricultural year October 1, 1951 down to this period. It was pointed out however, that there are several factors responsible for this appreciable reduction, among which are:

1) The influence of new synthetic fungicides.

2) Spray concentrates for the low volume applications not requiring sulfur, which have come into more extensive use in the last year or two.

3) Publicity regarding the need for conservation of pesticidal sulfur by eliminating sulfur from cotton dust formulations.

4) Proof of the gradual and substantial replacement of sulfur by more specific and more efficient organic pesticides.

It was felt, therefore, that a large part of the deliveries of crude sulfur for grinding are remaining in inventories or used for formulation of export dusts or being offered for non-agricultural purposes.

* * *

The 4th and final report of the Delaney Committee points out that fluoridation is a local problem to be resolved by each community and, therefore, no Federal legislation is recommended. The Delaney Committee in its 4th and final report dealing with the use of chemicals in food and cosmetics, pointed out, however, that there are many unanswered questions concerning safety of fluorides and suggested to local communities that in making decisions of fluoridating their water supplies, it is preferable to err on the side of caution. In general, the recommendations of the Delaney Committee were a surprise but the report has been issued, and the minority report which was signed by Representative A. L. Miller actually did not go quite as far as the report of the whole committee.

* * *

It is now clear that legislation to be submitted to the next Congress by Representative James J. Delaney governing the use of chemicals in foods, will undoubtedly be patterned after the new drug section of the Federal Food, Drug & Cosmetic Act. It is believed that the amendment will apply principally to the person proposing the use of the chemical in food, whether he be a chemical manufacturer or a food processor. It will require the proponent of satisfy the Food & Drug Administration that his scientific investigations establish the safety of the additive. In the event of an unfavorable FDA decision, it is believed that the legislation will allow the applicant to request FDA to hold a hearing.

If after a hearing, FDA still rules unfavorably, the proponent should have the right to appeal to the courts. The judicial review feature is considered most important by chemical and food manufacturers to avoid possible mis-administration of the law.

* * *

The Nitrogen Industry Advisory Committee of NPA at a meeting early in July recommended that maximum favorable consideration be given applications for rapid tax amortization of the nitra-phosphate portion of integrated ammonium-nitra-phosphate facilities. It also opposed rapid tax amortization for ammonia producing facilities which might be constructed in connection with such integrated nitra-phosphate plants, if the ammonia facilities to be built exceed the authorized expansion goal. There was general disagreement among many members of the committee as to whether the present 2.9 million ton nitrogen expansion goal set for 1955 is sufficient for requirements. Some members indicated that in areas east of the Rocky Mountains, no nitrogen deficit will exist in 1955. However, a surplus of nitrogenous fertilizer materials is anticipated by industry in the West Coast area, but agricultural requirements indicate a potential shortage of 35,000 tons. Further, a shortage of direct application liquid ammonia is expected in the Gulf areas because of increasing demands. However, it is believed that ample ammonia will be available in the Gulf Coast, South and Southwest areas, when new facilities come into production.

•

Fertilizer at Retail

OPS on July 21, amended the General ceiling Price Regulation to provide that sales of fertilizer to farmers shall be considered retail sales instead of wholesale sales under the General Ceiling Price Regulation.

This change in the law may have the effect of raising ceiling prices somewhat. OPS officials cautioned, however, that sellers who gave special prices to farmers during the base period, or to different classes of farmers, must continue to do so now. The amendment does not change the OPS rules which require that price differences to different classes of purchasers must be maintained.

This action. Amendment 32 to the GCPR is required by section 402(d)(5) of the Defense Production Act, which was included in the 1952 amendments adopted by Congress last month, and which provides as follows:

"For the purpose of determining the applicable ceiling price under the General Ceiling Price Regulation issued January 26, 1951, as amended, any sale of fertilizer to the ultimate user by a person who acquired it for resale shall be considered a retail sale."

'Definitions of "sale at retail" and "sale at wholesale" contained in Section 22 of the GCPR are amended to conform to this provision.

Under the amendment, a reseller's

(*Turn to Page* 101)

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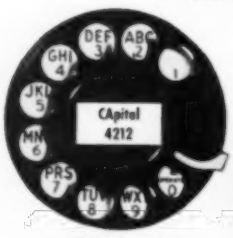

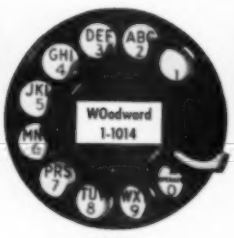

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The Listening Post

Control of Golden Nematode of Potato

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

IN last month's "Listening Post" we reported tests with various treatments to control golden nematode adhering to imported lily-of-the-valley pips. Effect of the treatments on the pips themselves was the subject of investigations reported by Henry H. Richardson and F. J. Spruyt, of the U. S. Bureaus of Entomology and Plant Quarantine and Plant Industry, Soils, and Agricultural Engineering, respectively.

Plant nematode pests can be spread not only on their specific host plants but also on other non-host plants or on material in which they become physically entangled. Thus viable cysts of the golden nematode of potatoes (*Heterodera rostochiensis*) were intercepted in November, 1949, by foreign plant quarantine inspectors of the U. S. Bureau of Entomology and Plant Quarantine among the roots of lily-of-the-valley pips (*Convallaria* sp.) imported from Germany through the port of New York. The cysts were adhering to but were not parasitic on the roots, and could not be entirely removed by repeated washings. Apparently the pips had been grown in soil used recently for potato production. A project was started immediately by the Bureau of Entomology and Plant Quarantine, in cooperation with the Bureau of Plant Industry, Soils, and Agricultural Engineering, in an effort to develop a treatment that would destroy these cysts and permit the distribution of the pips in the normal channels of trade without disseminating this dangerous pest.

In determining the reaction of pips to various treatments, approximately 600 experimental tests and 38 large-scale treatments involving over 350,000 pips, were made from November 1949 to November 1950, at the Plant Quarantine Inspection House at Hoboken, New Jersey.

The pips were forced at the greenhouse of the Nematode Research Laboratory at Hicksville, New York, within the quarantine area, or at other cooperating greenhouses. The tests for lethality of the treatments to the cysts, which were reported in the last *Listening Post* were usually made in conjunction with the treatment of the pips.

Lily-of-the-valley pips for export from Germany are tied into bundles of 25 pips each after harvest, packed in wet sphagnum moss, and shipped to the United States under refrigeration at 28° to 30° F. They are kept solidly frozen for periods of one month up to a year or more until desired for forcing by the growers. The methods of treatment tried after thawing included heat treatments of these bundles by immersion in hot water and by exposure to vapor heat; fumigation with methyl bromide, hydrocyanic acid gas, or acrylonitrile; and chemical dips of compounds known or suspected to be toxic to the cysts. The tolerance of the plants to all these treatments was judged mainly by the subsequent growth of the leaves and flowers, especially the latter. Flowers were graded into (a) fancy, (b) firstgrade, (c) second or utility grade, and (d) injured, depending on the height of the stem, and the number, size, and quality of of the bells.

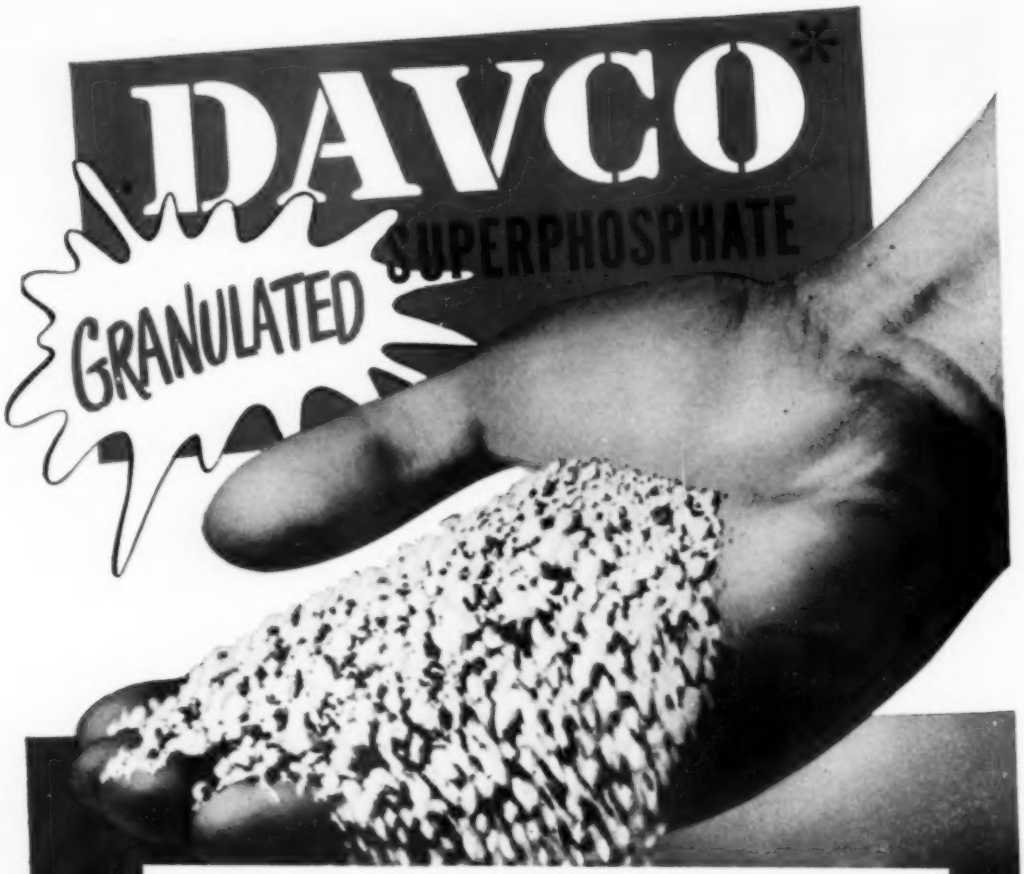
Heat Treatments

IMMERSION in hot water at 118° F. for 30 minutes has been most promising treatment thus far, and has been fairly well tolerated by the pips. A hot-water treatment at 132° for five minutes, as recommended for potatoes, was too drastic and caused stunting of both the leaves and flowers. Temperatures of 130° for 10 minutes, 125° for 20 minutes, 116° for 55 minutes, 115° for 90 minutes, 114° for 120 minutes, and 112° for 180 minutes were likewise injurious. The pips showed some tolerance to cyst-killing exposures to vapor heat, but its penetration into the densely bunched roots was so slow that studies along this line were abandoned.

Fumigation

METHYL bromide fumigation at dosages recommended for the disinfestation of potato bags, i.e., approximately 4¾ pounds per 1000 cubic feet for two hours or 22½ pounds for 16 hours, caused complete kill of the pips. The maximum dosage schedule tolerated by the pips at 60° to 65° appeared to be near 3 pounds for four hours at normal atmospheric pressure. Cold pips at 35° were more tolerant than warm pips at 65°. Freshly imported pips were thawed and warmed to 65°, fumigated with 4 pounds for two hours, then refrozen and stored for three months at 28° to 30° before forcing, with little or no injury to the plants and flowers. One suggested dosage schedule, of approximately 4⅓ pounds for two hours at 70° was also tolerated by the pips but proved ineffective against the cysts.

Dosages of an acrylonitrile-carbon tetrachloride mixture and of hydrocyanic acid gas tolerated by the pips were not effective against the cysts. A 50:50 mixture, by volume, of acrylonitrile and carbon tetrachloride caused complete kill of the pips at dosages of 3.3 up to 20 pounds per 1000 cubic feet for four hours at 65° to 70°. *Convallaria* pips tolerated



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dosages of hydrocyanic acid gas up to ½ pound per 1000 cubic feet for one hour in a 15-inch sustained vacuum, but dosages of one pound caused considerable stunting and 2 and 3 pounds caused severe injury or complete kill.

Chemical Dips

NONE of several dips (usually 5 min. at 75° F.) proved promising, as the limits of tolerance were below the point where cyst mortality was complete. Trial of several chlorophenols was suggested. However, a five-minute dip in a 0.05% water solution of 95% trichlorophenol ("Dowicide 2") caused severe stunting and injury to the pips. At 0.25% strength the flower crop was fair. Injury still resulted from the 0.05% solution even when the pips were washed with water for one to five minutes immediately after the dipping, and only 10 to 40 percent of them produced commercial flowers. The pips apparently removed a considerable amount of the chemical from the solution, for there was little or no plant injury after the dip had been used twice. Refreezing and storing the treated pips for one to four months appeared to increase plant injury to some extent.

A 1% emulsion of pentachlorophenol caused severe plant injury. A fair crop of flowers was produced after the pips were dipped in 0.5% emulsion of pentachlorophenol or a 0.5% or 1% solution of sodium pentaphenate.

Franklin reported 5% formaldehyde effective against the cysts in three-hour dips at near 75° F. However, formaldehyde dips caused severe stunting of lily-ofthe-valley in the following treatments: 5% for five or 15 minutes at 118°; or 0.185% for 30 minutes at 118°. The last is the usual concentration used in bulb treatments in the Pacific Northwest. Injury occurred even when the pips were dipped in fresh water for one minute following treatment.

Pips treated with parathion at concentrations of 0.06% and 0.033% produced fair to good crops of flowers, 84 to 95 percent, respectively. Refreezing and storage after treatment increased the injury slightly.

Iodine at 0.001% to 0.002% was well tolerated even when treated pips were refrozen for one to four months before forcing. One-percent ethyl mercury phosphate ("Semesan Jr.") diluted 1 to 500 gave fair flower crops, but a 5% strength ("Ceresan N.F.") diluted 1 to 500, and 5% phenol caused severe injury.

Practical application of the hot-water treatment: Immersion in hot water at 119° to 120° F. for 30 minutes was suggested as an emergency treatment in February, 1950, and more than 300,000 of the 1949 pips were treated prior to November, 1950. In February, there was little difference in growth, but from April through November there was a slight stunting and delay; however this was not serious enough to prevent production of a commercial crop of flowers.

In additional tests made from January to May, 1951, the treatment caused more serious stunting on 1950 stock, particularly if grown afterwards on a cold 55° to 60° bench. The margin of tolerance to the heat treatment is very small. It now appears that the treatment should be relaxed to 118° F. for 30 minutes. Further tests with the cysts embedded in actual bunches of pips indicated that this treatment would be completely effective, and flower crops appeared to be only slightly reduced from those of untreated checks. This treatment is a drastic one for *Convallaria* pips but it appears to be the best of those tried. Every lot of pips varies slightly from others, and the latest work indicates that the condition of growth and the bench and air temperature are important.

The following procedure has been used at the Plant Inspection House at Hoboken, New Jersey: The pips are thawed for approximately one day in summer or for one to two days in winter. The bunches are separated from the sphagnum moss and packed rather closely into wire-mesh baskets. No prewarming is necessary, but the water temperature is prevented from dropping below 118° F. by the addition of sufficient steam to offset the cooling effect of the load of pips. After the 30 minute immersion, the pips are drained for five minutes. This drain period, in which temperature loss is slight, compensates for the time needed at the start for the heat to penetrate into the center of the bunches. After drainage, the pips are hosed or dipped for five minutes in cool water near 50° to 60° to bring the temperature down uniformly, before being repacked. The boxes and sphagnum moss are treated separately by steam sterilization. The pips should be planted within three to four days or else the sprouts will be injured in the tightly packed boxes. Present indications are that treated pips must be handled more carefully than untreated pips. Forcing beds should be kept near 65° to 70° and the plants should be given top light gradually two or three days earlier than usual, allowed to harden gradually, and not exposed to strong drafts.

Refreezing and storage of pips after hot-water treatment has caused considerable injury. Pips that had started to sprout were injured by hot-water treatment, this injury ranging from moderate stunting on slightly sprouted pips to severe stunting and total loss of flowers where pips had sprouts 1 to 2 inches long. Larger pips with heavier roots appeared to withstand the treatment better.

•

Results of Chemical Tests

WILBUR D. Courtney and H. B. Howell, of the U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering and the Oregon Agricultural Experiment Station, respectively, write that during recent years the bent grass nematode, *Anguina agrostis*, has become a serious pest of bent grass in certain sections of the Pacific Northwest. It is probably not indigenous to this area but was perhaps introduced in poorly cleaned and graded grass seed shipments. This hypothesis is supported by the observations of pioneer producers of bent grass seed. According to them, nematode infection of bent grass was first found on a single isolated field, which many years previously had been plowed and planted

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Table 1.

Number of nematode-infected heads (inflorescence) in bent grass plots treated with chemicals

	Number of infected heads Replicates				
Chemicals	A	B	C	D	Average
Sodium nitrate	30	50	43	44	41.7
Cyanamid	50	31	35	39	38.7
Sulfur	44	48	40	63	48.7
Control	57	37	37	32	43.2

to a mixture of imported grass seed. The grasses in this mixture were thought to be superior to Astoria colonial bent for pasture, but within a three-year period they were entirely killed and replaced by the volunteer bent grass. It was many years after this incident that bent grass was first harvested for its seed. At that time nematode galls, then thought to be ergot, were found only in seed grown on this field. From this original source, the infection gradually spread to ad-

(*Turn to Page 115*)

Some Insect Conditions During July

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is connected with the department of Insect Pest Survey and Information, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

By Kelvin Dorward

Cotton Insects

THE boll weevil situation during July presented a rather spotted picture. In some areas heavy infestations were present while in others populations were considered below normal. Weevils were more abundant in the Rio Grande Valley of Texas than for several years. Practically every cotton field in Cameron, Hildalgo and Willacy Counties was subjected to attack and the fields in which a rigid control program was not followed were badly damaged. The last report from 26 North Carolina counties showed a sharp increase in square infestation. The infestation averaged 18 percent in poisoned and 40 percent in unpoisoned fields in comparison with 6 percent in poisoned and 19 percent in unpoisoned fields the previous week. Georgia and Oklahoma also reported marked increases by the latter part of July. The overall boll weevil situation, however, is one that may prove to be the lightest in several years. Hot, dry weather prevailing over a large portion of the cotton belt during July not only reduced the insect population but caused considerable shedding of squares.

The spider mite situation which during the middle of July was on the build up in Arkansas, Georgia, South Carolina and Texas, had failed by the end of July to develop into the serious problem that was expected. In California the mites were on the increase but at a slower rate than in 1951. Cotton fleahoppers were the heaviest in the Shreveport, Louisiana area since 1948 and control was necessary in many fields. Fleahopper populations were heavier in Texas during July of this year than for the corresponding period in 1951. By the latter part of July bollworms were reaching threatening populations in parts of Arkansas, Arizona, Georgia, Louisiana, New Mexico, Oklahoma, South Carolina and Texas. The cotton leafworm which was reported in the July issue of Agricultural Chemicals as being found in Cameron County, Texas June 3, a much earlier date than last year, was reported July 14 from Johnston County, Oklahoma. Reports of the insect have now been received from widely scattered sections of central and west Texas. One report was received from near Natchitoches, Louisiana.

Vegetable Insects

The potato leafhopper in July was reported as being the heaviest since 1945 on beans and potatoes in the New York Counties of Tompkins, Steuben, Livingston, Wyoming and Alleghany. In central and southern New Jersey Counties lima and snap beans were damaged by leafhoppers. Abundant populations on beans were reported from Indiana, Ohio and Maryland and on potatoes in Delaware, Wisconsin and Illinois. Tomato fruit worms caused damage to tomatoes and beans in New Jersey, and to tomatoes in Illinois, Missouri and Utah.

Other vegetable insects to cause concern during July included the beet leafhopper, the carrier of curly top disease, in Utah and Colorado. On the Colorado western slope, curly top was reported as causing 20 percent damage to tomatoes. Lygus bugs caused heavy damage to potatoes in Minnesota and damaged celery at Whitehall, Michigan. The European earwig was reported from New Hampshire for the first time. Other reports regarding this insect were received from California, Massachusetts, New York, Utah and Oregon.

Cereal and Forage Insects

Although the first generation of European corn borers was relatively light throughout most of the corn borer area, there are indications that the second generation will be of concern in several states. In late July second-generation borers were prevalent in late corn in the East St. Louis, Illinois area and to the south.

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Pupation was well advanced in central and northern Illinois and was much higher than in 1950 and 1951, ranging up to 90 percent in some fields. This indicates a larger second generation than occurred in Illinois during the last two years. Minnesota also reports that more second-generation borers are expected this year than were present in 1951. In southwestern Wisconsin there has been a build up and much stalk breakage is expected. Pupation in southeastern South Dakota Counties was well underway in late July and a heavy second generation was forecast. Iowa reports that conditions have been extremely favorable to product a heavy second brood of European corn borers. Infestation of potatoes by the European corn borer has been rather noticeable in Maryland this season, 20 to 90 percent of the potato plants in Washington County were damaged, as were 8 to 80 percent in Carroll County, 24 to 96 percent in Harford County and 8 to 96 in Howard County. Damage to potato plants was also reported from the Eastern Shore of Maryland.

The most serious outbreak of armyworms in Wisconsin in 10 years occurred during July. Losses to crops in Columbia, Dane, and Rock Counties were estimated to exceed one million dollars. Other states reporting armyworms in serious numbers during July were Michigan, Minnesota, Rhode Island, Iowa, Alabama and Vermont.

The vetch bruchid was reported in late July as being found rather widely distributed in the vetch seed growing area of northeast Texas. This is the first record of this pest from Texas. Collections were also made in four Oklahoma counties which indicates a rather wide distribution in that state.

Other outstanding cereal and forage insects reported during July included the corn earworm which early in the month caused up to 100 percent damage to some corn and tomato plantings in Washington, Grand and Box Elder Counties, Utah. Other states reporting serious damage from this insect included Indiana, Oregon, Colorado, Illinois, Delaware, Missouri and Minnesota. In the early part of the month chinch bugs reached outbreak proportions in Indiana with medium infestations being reported from Ohio. The black cutworm was reported as being the outstanding corn pest in Indiana this year. The first record of damage to clover by the lesser clover leaf weevil in Nebraska was reported in July. This insect was also reported damaging clover in Montana and Wyoming.

Fruit Insects

The outstanding development among fruit insects during July was the build up of spider mites in some orchards of Massachusetts, New Hampshire, New York, New Jersey, Maryland, Ohio, Illinois, Minnesota, Missouri, and Washington. A heavy second brood of codlings moths was expected in some Massachusetts orchards by August 1. In New Jersey there was a noticeable increase in codling moth injury during the latter part of July. Codling moth entries were increasing steadily in Lawrence and Orange Counties, Indiana and were expected to be numerous until early August. Late apple orchards in Illinois also showed many new entrances.

The oriental fruit moth was reported to be causing an unusual amount of damage to peaches in the Stoneville, Mississippi district. Second generation larvae were causing damage to peach twigs in Georgia. In Indiana second brood adults were reported early in July.

•

Flying Farmers to Meet

The Flying Farmers of America will hold its annual convention at Auburn, Alabama, August 27 to 31. Future Farmers of America and 4-H organizations will play a prominent part in the meeting, according to the advance program.

•

Fertilizer Salesman Dies

Harry W. Allen, 66, salesman for a Lockland, Ohio, fertilizer company, died July 5 at his home in Greenwood, Ind.

Bartley to Geigy Lab.

Geigy Co., Inc., New York, has announced the addition of Clayton E. Bartley to the technical staff of the company's laboratories at Bayonne, N. J. Mr. Bartley will do laboratory and field research work as well as assisting in technical sales problems.

Mr. Bartley held the New Jersey Peach Council Fellowship at Rutgers University where he studied the effect of nutrition on bacterial spot and burn rot of peaches. At Cornell Univ., he held a teaching assistantship in the department of plant pathology.

He holds degrees from the University of Maine and Rutgers, and completed three semesters of study toward a Ph. D degree at Cornell, majoring in plant pathology.

•

MGK Cuts Allethrin Price

Lower prices on allethrin have been announced by McLaughlin Gormley King Co., Minneapolis. The reduction is the third in a series made by the company since it began commercial production of allethrin in 1950.

In drum lots, freight paid, the new prices schedule is reported as follows:

100% allethrin, $32 per lb.; 90%, $28.80 per lb.; 20% solution, $6.65 per lb.; 2.5% solution, $7.50 per gallon.

An increased demand for the material, plus an expanded capacity for production made possible the reduction, MGK says.

•

Dickerson Adds "Inc."

The Dickerson Company, Inc. is the new name for the former Dickerson Company, Philadelphia, the company has announced. It adds that the proper designation for Dickerson Overseas Company is now Dickersons Overseas Company, a Division of the Dickerson Company, Inc. Both companies will continue with the same management and facilities, it is indicated.

More Farmers Are Saying:

"Give me

BORATED FERTILIZERS

for bigger crops of better quality"

BORAX... restores lost boron to soil

FERTILIZER MANUFACTURERS!

Here's Borax at the Lowest Cost per Unit...It's Fertilizer Borate

Especially developed for the fertilizer trade... higher analysis... lower unit cost. Containing approximately 121% Borax equivalent, FERTILIZER BORATE HIGH GRADE, with its water content reduced to approximately 24% (5 mols water), saves you important money in cost of transportation, storage, handling, etc.

In formulating fertilizer mixtures containing Borax, use 82.9 lbs. of Fertilizer Borate High Grade for each 100 lbs. Borax guaranteed. You figure the savings!

• Agricultural authorities agree that boron is an essential plant food just as are nitrogen, potash and others. A boron deficiency in soil causes dwindling crops and puny plants... but borax restores lost boron. Users of our fertilizer borates* report increased yields of alfalfa, pasture crops and many vegetable, field and fruit crops, plus greatly improved quality.

* **FERTILIZER BORATE** (*equivalent to approximately 93% borax*) and **FERTILIZER BORATE—HIGH GRADE** (*equivalent to approximately 121% borax*) offer you low-cost, economical sources of boron... in fine mesh for addition to mixed fertilizer, or coarse mesh for direct application where required. County Agents or State Experimental Stations should be consulted for detailed recommendations. Write today for literature and quotations.

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Technical Briefs

"Arasan"-Treated Seed

Tests of the effectiveness of "Arasan" seed disinfectant, started last fall in six southern states with the cooperation of E. I. du Pont de Nemours & Co., have recently been completed, with the results showing a striking increase in productivity of the fungicide-treated seed. The tests were carried on in Oklahoma, Texas, Alabama, Georgia, Tennessee and North Carolina and involved nine types of forage crops. The tests were staged to evaluate the effectiveness of seed treatment under the fall seeding program ordinarily followed by growers in this area. A list of the crops studied and the average stand increases reported from use of the "Arasan" treatment follows:

Crop	Avg. Increase
Alfalfa	60%
Crimson Clover	49%
Sweet Clover	48%
Sericea Lespedeza	130%
Ladino Clover	227%
Vetch	33%
Ky. 31 Fescue	39%
Rescue Grass	23%
Grass Mixture	17%

■

Pentachlorophenol Safe

Pentachlorophenol, used successfully on farms to protect wood against decay and insect attack, has been given a clean bill of health by Dr. C. S. Walters, associate professor of forest utilization research at the Illinois Agricultural Experiment Station.

His conclusions, after extensive tests begun in 1949, were that pentachlorophenol, used in the recommended concentrations, did not harm or interfere with the growth of livestock coming in contact with it.

Dr. Walters' study was partly sponsored by Monsanto Chemical Co., St. Louis, to check a statement by a visiting German scientist that chlorinated hydrocarbons were the cause of the mysterious "X disease" or hyperkeratosis fatal to cattle.

A more recent announcement dealing with the work of Dr. Dennis Sikes of Knoxville, Tennessee, professor of veterinary science at the University of Tennessee Agricultural Experimental Station, revealed the chemical pentachloronaphthalene as one of the causes of "X disease." Because of the similarity of the names of the two compounds (pentachloronaphthalene and pentachlorophenol) it was felt that misunderstandings might result.

"As far as I know," Sikes said, "there is no evidence to indicate that pentachlorophenol is responsible for this disease."

In the experiments conducted by Dr. Walters, swine, sheep and cattle from the University of Illinois herds were used. They were normally exposed to farrowing houses, feed bunks, water troughs, salt boxes, posts, gates and corral timbers impregnated with pentachlorophenol. Wood used in constructing the equipment included yellow pine, cypress, western pine and Douglas fir.

In addition, two of the swine and nine sheep were force-fed large doses of pentachlorophenol solution and other materials used in preparing the solution. The force-fed animals, none of which were visibly affected, were later slaughtered and thoroughly examined for evidence of harmful effects. Although minute amounts of the chemical were detected in various tissues of the force-fed animals, the amounts did not represent a health hazard to the animals or to those consuming pork or mutton.

●

Insecticides vs Fish

Tests to determine the toxicity to fish of chlordane, DDT, dieldrin, toxaphene, parathion and calcium arsenate are under way by Dr. James H. Stevenson, fish biologist and a special researcher for the Arkansas Game and Fish Commission.

According to investigations thus far, aldrin has been most toxic to goldfish which are bred commercially in the state for sale as bait. One part of aldrin to a billion parts of water can be fatal to the fish, he has found.

After two years of testing, the researcher has found that under optimum conditions fish can be killed from the drift of insecticidal dusts being applied as far away as a half mile, or by the accidental depositing of toxicants at the rate usually recommended for insect control. This was true of all insecticides studied, except calcium arsenate.

Dr. Stevenson has collected water from rice fields treated with one-tenth of a pound of dieldrin per acre, and this water killed fish unless it had been diluted one-half with pond water.

■

Corn Borer Control Tests

Results of laboratory tests with a series of organic compounds against newly hatched larvae of the European corn borer (*Pyrausta nubilalis* (Hbn.)) conducted at Toledo, Ohio, and Ankeny, Iowa, by the Division of Insecticide Investigations, B.E.P.Q., U.S.D.A. are reported in Bulletin E-840 of the Division. The tests were conducted by the Division of Cereal and Forage Insect Investigations of the Division of Insecticide Investigations from 1947 through 1950. The report is the work of D. D. Questel and S. I. Gertler.

●

Soil Fumigation Studied

Peanut root knot, caused by *Meloidogyne hapla* Chitwood, is widespread in the peanut growing area of North Carolina. The disease is very destructive in heavily infected soils. Row applications of Dowfume W-40, Dowfume N, D-D Mixture, or D-D Mixture plus 15 per cent chloropicrin, each at approximately 1.5 and 3.0 ml./ft. of row controlled root knot and resulted in normal yields. In untreated check plots the yields were reduced approximately 70 per cent. At the higher rate of application all materials were equally effective. A rotation experiment was initiated in heavily infested soil in

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Pigs or potatoes...cattle or carrots...growth is a never ending process.

And be it animal or vegetable, every living thing on a farm derives its basic nutrition from the soil. These plant-food elements yielded by the soil must also be replenished if the soil is to satisfy the vigorous demands made upon it.

That's where soil-replenishing fertilizers come in. Many of the most effective of these fertilizers contain POTASH . . . often Sunshine State Potash, a product of New Mexico. This fertilizer is more than a mere soil nutrient. It strengthens crops . . . thereby helping them to resist disease and drought.

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1950. Using a split-block design Roanoke soybeans, corn, cotton and peanuts were planted in both fumigated (Dowfume W-4d, 18 gal./A) and non-fumigated blocks. The entire area was planted to peanuts in 1951. The effect of crop rotation and soil fumigation on root knot control was evident in root knot indices and peanut yields in 1951. Preceding crops, other than peanuts, reduced root knot and increased yields in both fumigated and non-fumigated blocks. Within rotation treatments root knot indices were lower and yields were higher in the fumigated than in the non-fumigated blocks .

—"Control of Peanut Root Knot by Soil Fumigation," by W. E. Cooper, in *Phytopathology*, May, 1952.

•

Insect Control in Elevators

"Insect Control in the Country Wheat Elevator" is the title of a booklet (EC-24) just issued by the Bureau of Entomology and Plant Quarantine, U.S.D.A. Several residual sprays are recommended as satisfactory for treating wooden bins. Those containing DDT are classed as the most effective, but the warning is given that health hazards must be avoided. A spray of DDT wettable powder, no stronger than 2.5% and at the rate of 2 gals. per 1,000 square feet, is recommended. The bulletin notes that a spray containing 2.5% methoxychlor or 0.5% pyrethrins or allethrin is safer. Chlordane sprays are also reported effective, but again contamination of foodstuffs must be avoided. Fumigants discused include chloropicrin, calcium cyanide, carbon disulfide, ethylene dichloride, etc. A table lists suggested dosages. Emphasis is laid on the toxicity hazard in connection with use of fumigants.

•

Superphosphate Study

As of September 1, 1951, there were 202 plants producing normal superphosphate, 13 plants producing wet-process phosphoric acid, and 9 plants producing triple superphosphate. Of the 202 normal superphosphate plants, 91 had coexisting acid facilities. Two additional normal superphosphate plants were located outside of continental United States, one in Hawaii and one in Puerto Rico.

The total domestic production of normal superphosphate expressed as equivalent 18 percent superphosphate was 9,557,498 tons in 1950 and 5,274,223 tons in the first half of 1951. The average P_2O_5 contents of the normal superphosphate and wet-base goods produced in 1950 were 19.3 and 11.3 percent respectively. The 1950 production of normal superphosphate was obtained by cidulating 5,251,412 tons of phosphate rock with 3,156,495 tons of sulfuric acid (basis 100 percent H_2SO_4). Florida was the source of 96.7 percent of this rock, Tennessee, 1.3 percent, and the West, 2.0 percent. Only 8.7 percent of the sulfuric acid used was spent acid. The rest was virgin acid and 83.6 percent of this was made from elemental sulfur.

The nine triple superphosphate plants produced 660,134 tons of equivalent 45 percent superphosphate in 1950 and 357,738 tons in the first half of 1951. The 1950 production averaged 46.0 percent of available P_2O_5. The industry used 274,122 tons of rock in 1950, of which 225,993 was mined in Florida, 7,805 in Tennessee, and 40,324 in Idaho and Wyoming. On the basis of equivalent 50 percent H_3PO_4, 490,952 tons of wet-process acid and 126,519 tons of electric-furnace acid was used to acidulate the rock.

The wet-process phosphoric acid companies used 1,062,930 tons of phosphate rock and 859,780 tons of sulfuric acid (basis 100 percent H_2SO_4) to manufacture 879,215 tons of phosphoric acid (basis 50 percent H_3PO_4). The rock tonnage was made up of 885,424 tons from Florida, 29,405 from Tennessee, and 148,101 from Idaho and Wyoming. The sulfuric acid derived from elemental sulfur amounted to 668,864 tons.

By product fluorine-containing compounds recovered in the production of normal superphosphate and wet-process phosphoric acid amounted to 24,144 tons in 1950 and a production of 26,908 tons was anticipated in 1951. These products were fluosilicates of sodium, potassium, ammonium, zinc, and magnesium, hydrofluosilicic acid, and sodium fluoride.

—Summary of "Survey of the Superphosphate and Wet-Process Phosphoric Acid Industries in the U. S. in 1950 and 1951," by Richard Adams, T. H. Tremearne, K. D. Jacob and L. G. Porter, U. S. Department of Agriculture.

•

How Defoliation Works

Cyanamid induced defoliation imitates normal defoliation except that it provides a means of removing leaves almost at will. It does this by producing a "shock" in the plants much the same as would a frost, or excess insect damage.

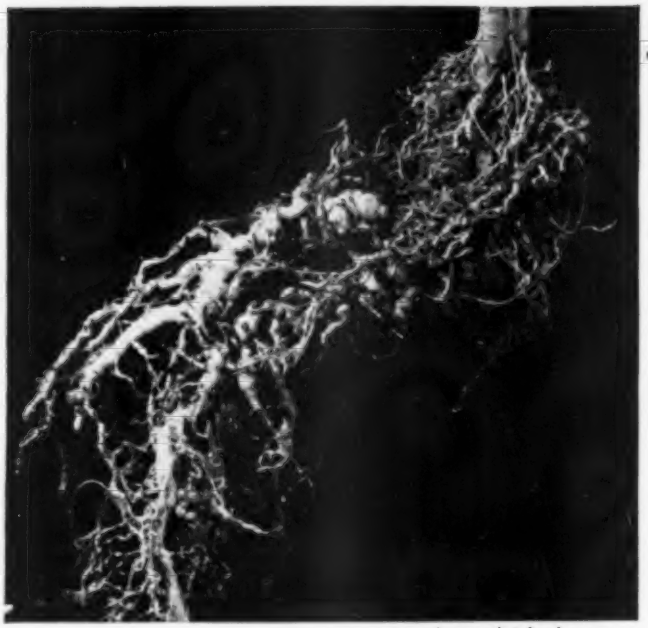
The "shock is produced this way. On settling on leaf surface, cyanamid begins to undergo chemical reaction with moisture, usually in the form of dew. It must have moisture and that is why dew must be present or expected when application is made. One of the products of this reaction is poisonous to certain parts of the leaf tissue. Upon entering the leaf, probably through the "guard" cells that regulate transpiration of water, this substance proceeds to destroy the susceptible tissue.

The plant now has leaf tissue that, although dead, still permits loss of water to the atmosphere. The plant reacts by developing a layer of cells near the base of the leaf stem, called an "abscission layer." Unlike other plant cells which hold closely together, the cells in an abscission layer separate easily. When enough such cells form, the weight of the leaf causes them to separate, and the leaf falls.

As noted, this process takes place as a result of frost on almost all deciduous plants. In addition to providing a splitting point, abscission cells are corky and effectively seal over the scar left by the separated leaf. In deciduous trees, this prevents water loss during the winter.

An overdose of any chemical defoliant will completely kill a cotton leaf, but instead of defoliating, it will "freeze" on the plant. This is because the leaf was killed so completely and quickly that the abscission layer does not have time to form before the sur-

(*Turn to Page* 113)



A nematode-infested tomato root

What you can do about NEMATODES

IT'S INCREDIBLE that a tiny soil pest—no bigger than a pinhole—is responsible for up to one quarter of all crop failures. Yet that's what nematodes can do.

How can this be? Nematodes burrow into feeder roots of more than a hundred important crops and obtain all the food they need simply by absorbing the plant fluids around them.

Their irritating presence causes the root cells of the host plant to multiply and enlarge abnormally—much like a cancer. Then, these swellings (root knots) cut off the food flow from the roots and literally starve the life out of a plant.

HOW TO FIND NEMATODES

Before your crops are harvested, go out to an area which shows poor growth. Pull up a few roots and examine them. If feeder roots are scarce and knots and galls are found, nematodes are in *your* soil. And that demands fast action.

HOW TO STOP THEM

The most powerful weapon against nematodes is a pre-planting soil treatment with D-D*. This liquid is injected into the soil by gravity flow plow equipment or by simple tractor attachments. It kills root knot, sting, stubby root, and other nematodes.

WHY YOU BENEFIT

This method provides a healthy soil which can then produce strong, healthy plants and maximum yields.

D-D has been widely used on a commercial scale in tobacco fields from Florida to the Carolinas, on fruit and vegetable farms from one end of the country to the other, and in pineapple fields of Hawaii with outstanding success.

Properly used, D-D is economical, usually paying for itself many times over in increased profits.

• • •

Check for nematodes today. Your insecticide dealer has D-D and can help you with your soil treatment problems. For further information, write to Shell Chemical Corporation, 808 William-Oliver Building, Atlanta 1, Ga.

*D-D, a soil fumigant. Trade Mark Reg. U. S. Pat. Off.

Radio-DDT Studied

Radioactive DDT Aids Better Control of Mosquitoes and Other Insects:

The use of radioactive DDT is furnishing clues to more effective ways to kill mosquitoes and other insect pests, according to entomologists of the U. S. Department of Agriculture.

By the use of radioactive DDT, entomologists can measure the amount of the chemical absorbed by the insects. They also can measure the extent to which insects have become resistant to DDT under varying conditions.

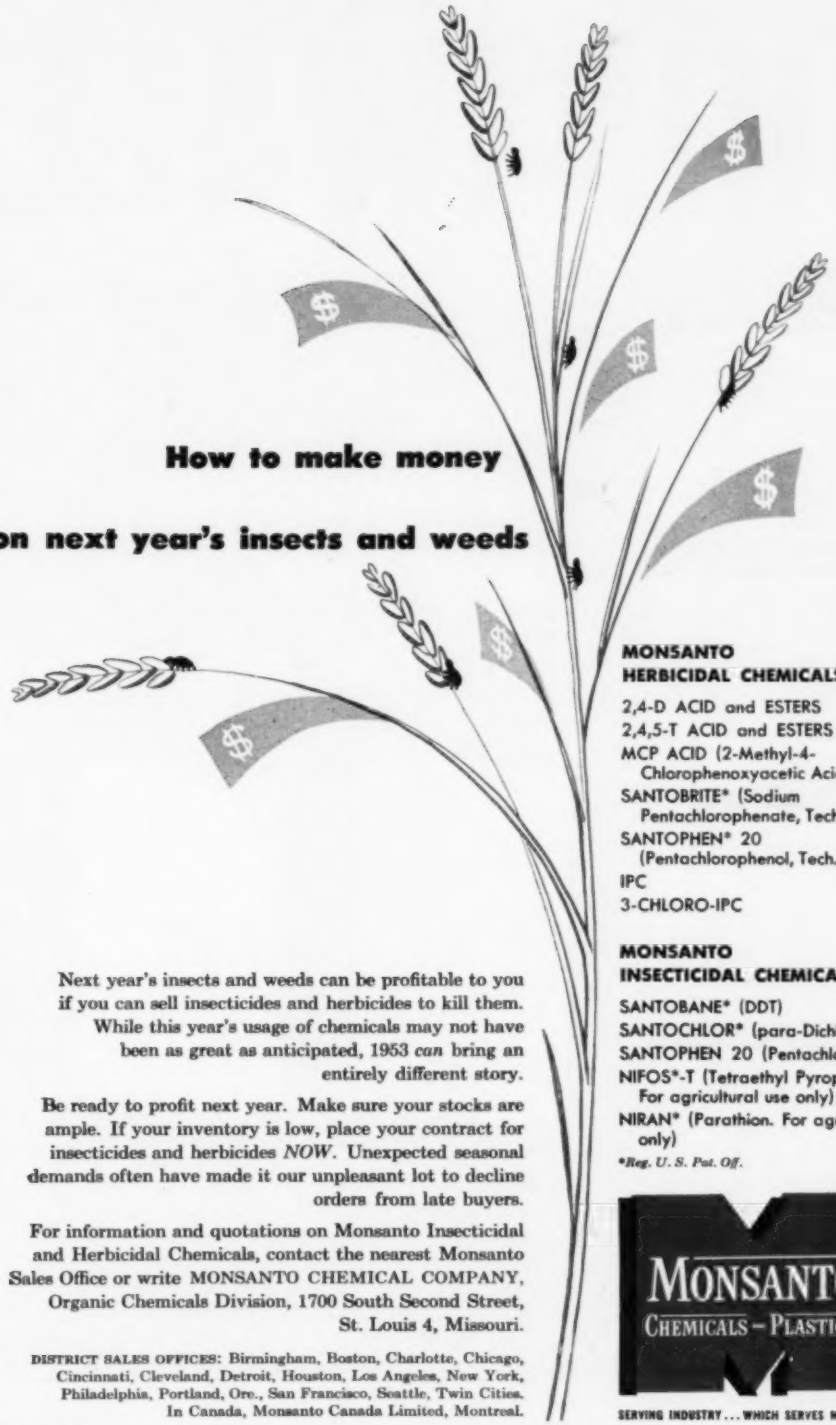
Tests of absorption of radioactive DDT by mosquitoes were made at the Oregon Experiment Station. The DDT was made radioactive by substituting radioactive carbon in the benzene used in making the DDT.

Bureau of Entomology and Plant Quarantine scientists at the Oregon station measured the radioactivity of mosquito larvae and pupae which had absorbed the treated insecticide. These tests showed that DDT is more effective against the larvae. Eleven times more DDT was necessary to kill the pupae than to kill the less resistant larvae.

Other tests showed that larvae are much more resistant to DDT when the temperature is high. Larvae were able to absorb nearly twice as much of the chemical at 90° as at 70°F., and the death rate was lower.

Previous experiments have indicated that mosquitoes from areas which have been treated frequently with DDT have developed resistance to the chemical. This was confirmed in tests when resistant larvae absorbed more than 6 times as much radioactive DDT as nonresistant larvae of the same species, yet 20 percent fewer resistant larvae died. When DDT was used in a lighter dosage, resistant larvae absorbed twice as much of the chemical as nonresistant ones, with only 11 percent mortality, compared with 100 percent mortality for the nonresistant larvae.

These experiments on mosquitoes were performed and reported by C. M. Gjullin, A. W. Lindquist, and J. S. Butts, U.S.D.A.



How to make money on next year's insects and weeds

Next year's insects and weeds can be profitable to you if you can sell insecticides and herbicides to kill them. While this year's usage of chemicals may not have been as great as anticipated, 1953 *can* bring an entirely different story.

Be ready to profit next year. Make sure your stocks are ample. If your inventory is low, place your contract for insecticides and herbicides *NOW*. Unexpected seasonal demands often have made it our unpleasant lot to decline orders from late buyers.

For information and quotations on Monsanto Insecticidal and Herbicidal Chemicals, contact the nearest Monsanto Sales Office or write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

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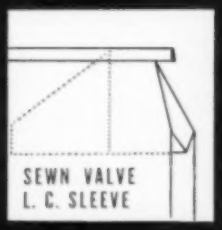

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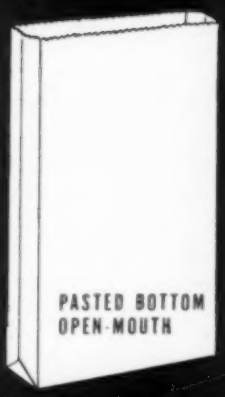

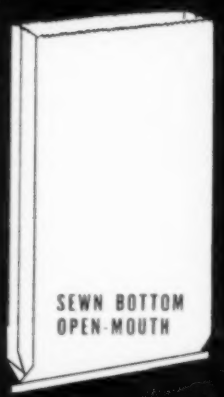

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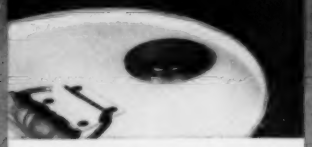

LEAKPROOF—One-piece molded plastic, sealed directly on pail metal. Stronger than pail itself.

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FLEXIBLE POURING SPOUT—Extends for easy pouring. No muss or fuss . . . because only inside of spout touches liquid.

RE-SEALS TIGHTLY—With plastic screw cap. Protects volatile liquids. Spout retracts for easy stacking.

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FLEXSPOUT is a *lot* more than just another pail closure. It's a powerful sales tool that will help you sell *more* of any liquid packaged in steel pails. Every feature of this unique new closure adds up to customer satisfaction and extra sales appeal.

FLEXSPOUT is leakproof and tamperproof. It is easily opened with any pointed tool. It has a flexible pouring spout that extends for easy pouring, retracts out of the way for easy stacking and storage. A handy plastic screw cap permits tight, positive re-sealing.

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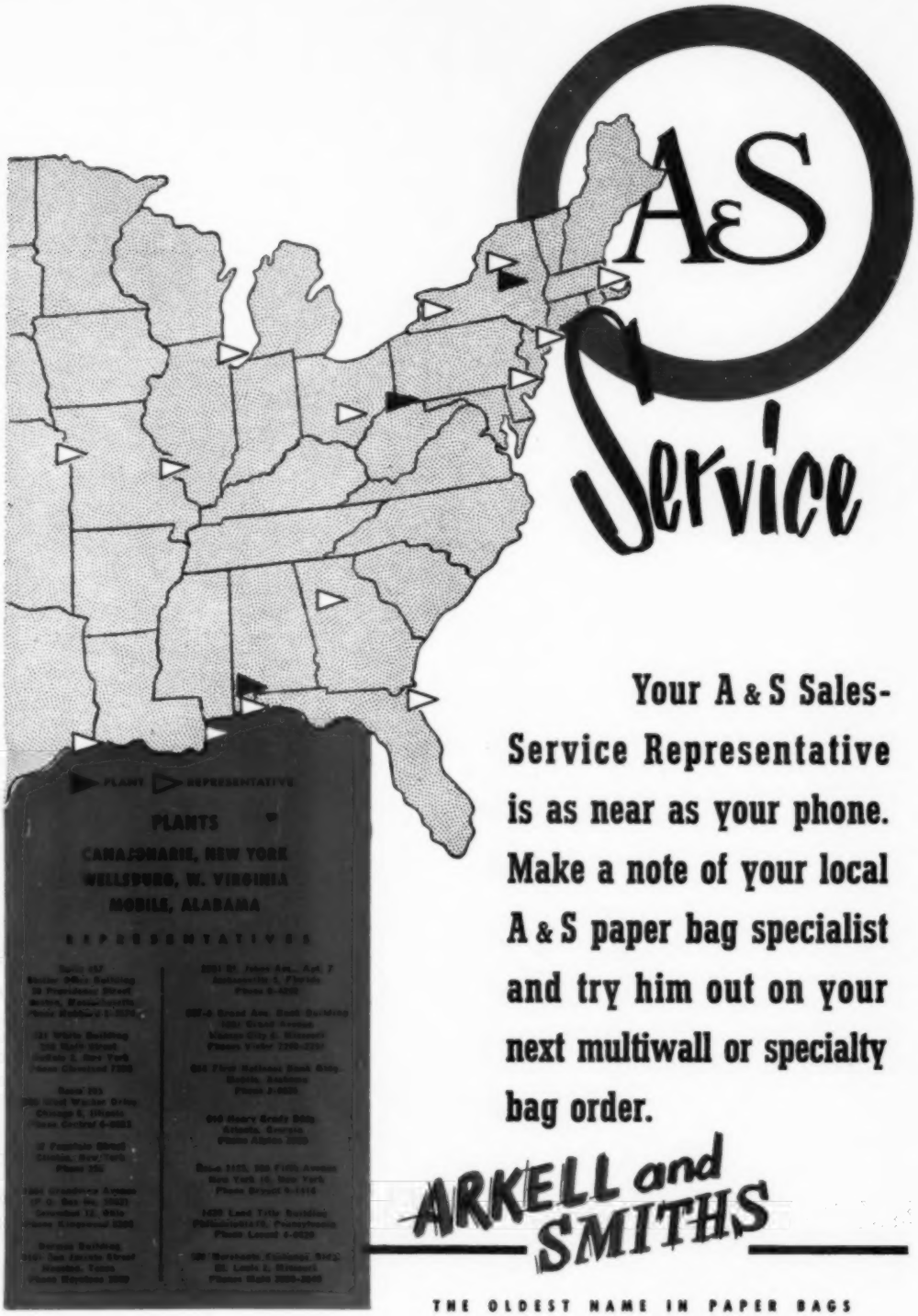

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Very small amounts of DARVAN maintain finely divided solids or liquids dispersed in water over long periods of time. Settling out and loss of concentrate as sludge is held to an absolute minimum.

DARVAN breaks up agglomerations and flocs to their ultimate particle size. Toxicants are effective, react quicker because of the greatly increased surface area of smaller sized suspended particles.

DARVAN is soluble in water, with a neutral pH, and stable toward mild acids and alkalis.

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Tests indicate that very small amounts of DARVAN actually increased the effectiveness of the toxicant in wettable concentrates. Field tests showed greater crop yields when DARVAN was added to the active agent and carrier than when the same agent and carrier were used without DARVAN. The addition of DARVAN with a wetting agent also increased the yield, while addition of a wetting agent without DARVAN decreased the yield.

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DARVAN is offered in two grades. Please describe your applications to aid us in making the proper recommendation. Write today for complete information.

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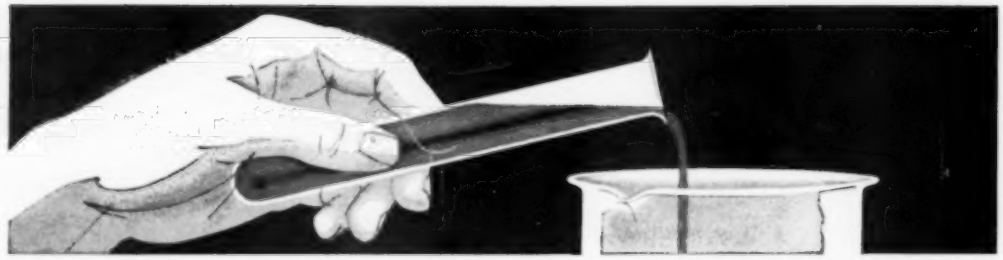

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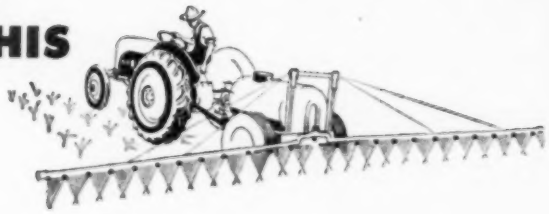

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For optimum performance in Toxaphene, Toxaphene/DDT, Aldrin and Dieldrin systems.

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For optimum performance in BHC, BHC/DDT and Lindane systems.

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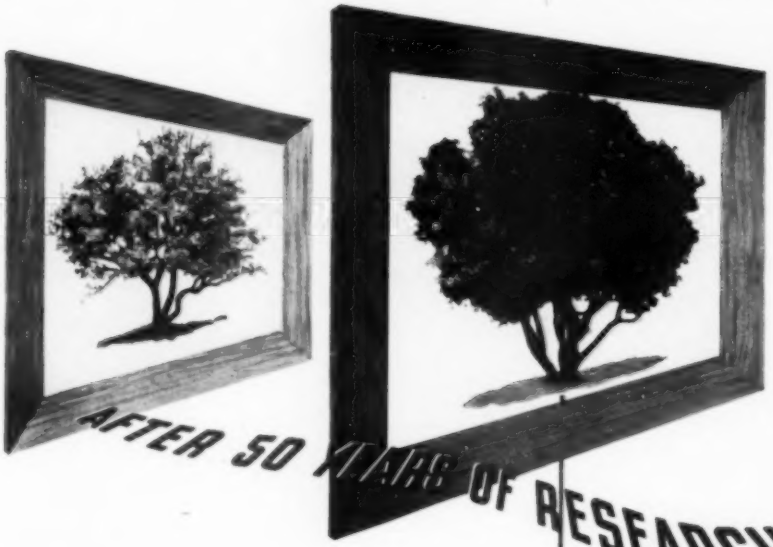

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Sequestrene* makes iron deficient crops green within four weeks and keeps them green for nine months or longer. Sequestrene presents the answer to a basic problem that has eluded man's ingenuity since he first dipped a hoe into the soil. That problem was to devise a practical method of inducing minerals into mineral deficient crops.

In actual field tests during the dormant season last winter Sequestrene made crops green in four to six weeks after application. In the spring these crops bloomed and produced new dark green growth three weeks earlier than untreated crops.

Sequestrene makes these results possible because this formulation enables crops to assimilate iron and therefore, corrects the disease known as iron chlorosis which causes yellowing of the leaves, defoliation and often death to the crop.

The initial tests have been performed on orange trees in Florida and involve a combination of Sequestrene and ferrous sulphate applied to the soil at the base of the trees. Spray applications to foliage also have demonstrated considerable promise.

Additional tests are being conducted for the treatment of such mineral deficiencies as copper, zinc, manganese, cobalt, magnesium and other essential trace metals.

*"Sequestrene" is the registered trademark of the product of Alrose Chemical Co., a Geigy Company.

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INDUSTRY NEWS

New Superphosphate Plant

Davison Chemical Corp., Baltimore, has just started construction of a new plant for the production of triple superphosphate at Ridgewood, near Lakeland, Fla. When the plant is completed, scheduled for October, 1953, 250 will be added to the Davison payroll. The plant will be under the supervision of Dr. Allan T. Cole of the Phosphate Rock Division of Davison.

The new project is part of a program under which Davison will devote $25,400,000 to new and expanded production facilities. Of this total, 73% will go for the new triple superphosphate plant and a cracking catalyst plant being built at Lake Charles, La., and the remaining 27% to expansion and modernization of present facilities at existing plants, the purchase of additional phosphate rock mining lands, etc.

Reasons cited for Davison's entry into triple superphosphate manufacture were rising costs of fertilizer production, which have tended to make the concentrated triple superphosphate product a more economical source of phosphate. It is an essential ingredient in the so-called "high analysis" fertilizers which are being recommended increasingly by agronomists.

•

Dieldrin Accepted by USDA

The United States Department of Agriculture has accepted dieldrin for registration, for control of first brood plum curculio on peaches. Experiments conducted in several peach growing states have proven that plum curculio damage to peaches is sharply reduced as a result of early season applications of dieldrin.

F. W. Hatch, manager of the Agricultural Products Department of Shell Chemical Corporation, said that peach growers could control plum curculio economically without endangering the quality of the crop by early season application with dieldrin. This was the finding of tests run in Arkansas, New Jersey, Virginia, Georgia, Tennessee, North Carolina, Pennsylvania, Delaware, Illinois and Wisconsin. The USDA acceptance is based on these data.

In experiments conducted in small-plot and large-plot orchards at Fort Valley, Georgia, application of dieldrin proved superior to other known materials for controlling plum curculio. Dieldrin did not affect the flavor of the fresh ripe peach, nor was any phytotoxicity observed on the fruit, leaves, bud, budwood, or any part of the peach tree.

The plum curculio damages peaches by puncturing the fruit for feeding and egg-laying. Later, its larvae tunnel through the fruit, feeding on the pulp. Attacks by the pest also promote the spread of brown rot on peaches.

•

Acquires Glendon Interest

A substantial interest in Glendon Pyrophyllite Co. has been acquired by American Encaustic Tiling Co. of Lansdale, Pa., according to a recent announcement by Winifred L. Haag, president of Glendon. Mrs. Haag has also announced her own retirement as president. The new president is Albert P. Braid who brings to the company the benefit of many years of experience as an engineer and administrator.

According to Mrs. Haag, the Glendon Pyrophyllite Co. will continue to operate without other change in personnel and with no change in policy. "Every effort will be made to continue to give our customers the best in service and product," she says.

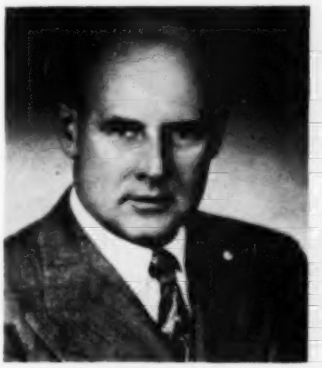
Glendon is also associated with Carolina Pyrophyllite Co. and United Feldspar and Minerals Corp.

•

Potash Price Advanced

American Potash & Chemical Corp. has received approval from the OPS for a higher price ceiling on muriate of potash. The new price is set on 60 percent muriate of potash in bulk at 53¢ per unit K_2O, f.o.b. Trona, Calif. The price was formerly 50½¢ per unit.

N F A Names Ware, Geoghegan to Head Board



LOUIS WARE

Louis Ware, president of International Minerals & Chemical Corp., Chicago, Ill, was named chairman of the board of directors, National Fertilizer Association, at the group's recent meeting at the Greenbrier, White Sulphur Springs, W. Va. E. A. Geoghegan, Southern Cotton Oil Co., New Orleans, was made vice-chairman of the board at the same meeting.

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Sees Better Sulfur Supply Ahead

THE world sulfur shortage, critical since the Korean War began, has improved to the point where virtually all sulfur requirements in the United States are being met, Langbourne M. Williams, Jr., president of Freeport Sulphur Company, declared at a press conference July 17. He termed the outlook for the future as "extremely encouraging" as a result of nearly 100 new projects to increase the sulfur supply in the United States and other free world countries.

These projects, it is estimated, will add approximately 4,000,000 long tons of sulfur per year by the end of 1955, he said. This amount is equivalent to one-third of the estimated 1951 free world production of about 12,000,000 tons of sulfur in all forms.

"The large gap between supply and demand no longer exists," Mr. Williams said. "Although sulfur consumption is still under government limitation, all but a few consumers in this country are getting all the sulfur they need, and the situation abroad has also improved.

"The outlook for the future is extremely encouraging. There is enough new production in sight to dispel the threat of a continuing shortage. Even if the requirements of U. S. industry and agriculture should increase by 1955 to the level estimated by N.P.A. there will be enough sulfur to meet the demand assuming the new projects measure up to expectations."

The new projects listed by the Freeport official are expected to add approximately 1,500,00 long tons in various forms to the annual production capacity of the free world by the end of this year, 1,350,000 tons more by the end of 1953, 250,000 tons more by the end of 1954, and 900,000 tons more by the end of 1955.

The efforts to increase the supply, he said, cover a broad range of activity. They include five Frasch process salt dome projects in Louisiana and Texas, which with an estimated annual production of 1,370,000 tons of sulfur are making the largest contribution. The bulk of the production will be under way by the end of 1953.

In addition, Mr. Williams said, there are 50 projects under way to obtain sulfur in the form of brimstone from native deposits, sour natural gas, refinery gases, etc., and 37 projects to obtain sulfur in various other forms.

"The American sulfur producers by 1951 had increased their production to about two and a half times the average for the prewar period 1935-39," Mr. Williams said. "As a result, a large part of the needs of our allies for sulfur has been supplied, all the requirements of our own essential defense industries and a high percentage of other domestic needs have been met, and our stockpiles have been kept from falling below the minimum for national security."

•

Reactivate Israel Plant

Israel's Dead Sea Potash Works, which has been idle for four years since the Arab-Jewish War, will shortly resume production under the control of a new company in which the Israel Government will control 51% of the voting power. In 1947, last year of normal production, the plant exported 100,000 tons and earned more than $7,000,000. The Dead Sea has long been one of the cheapest exploitable sources of potash in the world.

•

To Build Fert. Plant

Federal Chemical Company, Louisville, Kentucky, has announced purchase of a site for a new fertilizer plant at Danville, Illinois. The 40-acre tract of land is located on Ross Lane and was formerly owned by The Hegeler Zinc Company. Building plans call for a modern factory which will manufacture superphosphate as well as complete fertilizers. It is estimated that at least fifty employees will be required to operate the plant. Operation is expected to begin early next year.

The Federal Chemical Company has been making fertilizers for 68 years and is one of the oldest west of the Allegheny Mountains. Its line of "Federal Fertilizers" is manufactured in Louisville, Kentucky; Columbus, Ohio, Nashville and Humboldt, Tennessee; Butler, Indiana; and Meridian, Mississippi.

•

"Aerotil" to Farmers

Recent production increases of "Aerotil," American Cyanamid Company's soil conditioner, have made it possible for the firm to market it in limited quantities to farmers throughout the nation, according to F. S. Washburn, director of Cyanamid's Agricultural Chemicals Division. Previously, the company sold the conditioner only to other manufacturers who marketed it under their own trade names to home gardeners.

Cyanamid is entering the agricultural market with "Aerotil" through numerous firms who have long distributed other products of the Agricultural Chemicals Division.

"Aerotil" is produced in two forms,—easily soluble, highly concentrated flakes for sprinkling, and a powdered compound for "raking in" applications. Both forms will be marketed in 20 pound and 40 pound containers.

•

Monahan to OPS

T. V. Monahan, assistant treasurer of Rohm & Haas Company, Philadelphia, has been appointed chief of the Chemicals Branch of the Rubber Chemicals and Drugs Division, Office of Price Stabilization, Washington, D. C.

•

Ky. Fertilizer Plant

Southern States Cooperative has announced that construction of its new mixed fertilizer plant is under way at Louisville, Ky. The plant is expected to be in operation during the spring of 1953. It will have an annual production capacity of about 40,000 tons.

Many of our present customers were among our first ones over forty years ago, and they often remark that one thing about us has never changed: the Ashcraft-Wilkinson reputation for reliable service.

Users and manufacturers of agricultural insecticides everywhere know that Ashcraft-Wilkinson stands squarely behind every product sold. Our own laboratory, located near the source of raw materials, enables us to analyze and certify chemicals as to formula and content before distribution to the insecticide formulators. Good service is further assured by our several conveniently located branches.

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Odom to N. C. I. Post

Northern Chemical Industries has announced, through J. E. Totman, president, the appointment of George J. Odom as chief chemical engineer of their operations at Searsport, Maine. Mr. Odom comes to N.C.I. after twenty-nine years of service in various capacities with Monsanto Chemical Company's Merrimac Division Branch at Everett, Massachusetts.

Following graduation in 1923 from Colby College with a B. S. degree in chemistry, Mr. Odom began his career with Merrimac Chemical Co. at Woburn, Massachusetts, which plant was consolidated with Monsanto in 1929. He held various positions in the production and executive departments, and for the past ten years was plant superintendent.

He is a recognized authority on the manufacture of sulphuric acid, sulphate of alumina and other heavy chemicals. He is a member of the American Institute of Chemical Engineers, serving as secretary of the Boston section.

•

Phosphate Fertilizer Plant

A new phosphate fertilizer plant is to be constructed at Salt Lake City, Utah, by Stauffer Chemical Co., American Smelting & Refining Co. and Kennecott Copper Corp. When completed it will produce approximately 60,000 tons per year of concentrated phosphate fertilizers. The joint company which will operate the plant, and which is as yet unnamed, will be capitalized for between four and five million dollars. In addition to phosphate fertilizers, the new plant will also produce phosphoric acid. Phosphate rock will come from Stauffer's extensive deposits in Woyming and Idaho, and sulfuric acid from Garfield Chemical Company's plant now being enlarged at Salt Lake City. The additional acid will come from smelter gases. Construction will commence late this summer, and the plant is expected to go into production during the summer of 1953.

Demand for concentrated phosphate fertilizers has risen sharply in recent years. Located near its source of raw materials, this plant will also have a wide market area, extending from the Pacific Coast to the Midwest.

•

Stauffer Names Goodhue

R. K. GOODHUE

Stauffer Chemical Company has announced the appointment of R. K. Goodhue as their Akron district sales manager. Mr. Goodhue has been associated with Stauffer since 1942. He is married, has four sons, and will make his home in Akron.

•

Transferred by Cyanamid

The transfer of H. K. Booker from North American Cyanamid Limited, of Canada, to Chemical Construction Corporation in New York has been announced by American Cyanamid Company, parent firm.

Mr. Booker was formerly Works Manager of N.A.C.L.'s Welland works at Niagara Falls, Ontario. In his new post, he will work on design and construction of ammonia plants throughout the world. In 1919, he was graduated from McGill University, Montreal, Canada. He later pursued post graduate studies at Syracuse University in the U. S..

•

New Process Announced

A new process for the production of solid ammonium nitrate fertilizer will be utilized by Commercial Solvents Corporation, at its plant being erected near Sterlington, Louisiana, according to J. Albert Woods, CSC president. Basic materials, anhydrous ammonia and nitric acid, are already being made by the company and an area of twenty-two hundred acres has been purchased about 2½ miles from the present ammonia production unit. The new ammonium nitrate plant will be located in the center of this property.

Production of ammonium nitrate fertilizer by CSC will be in addition to anhydrous ammonia and nitrogen solutions which are already being marketed by the Agricultural Chemicals Division of the company.

Selection of the new process was made after several years of experimental work. The process was developed by Leonard A. Stengel of Commercial Solvents' research and development department, Terre Haute, Indiana. The process is patented and all rights have been assigned to the company. Mr. Stengel is an authority and holder of many patents pertaining to high pressure synthesis of ammonia and methanol produced from natural gas. In 1926, he placed in operation the first synthetic methanol plant in the United States which was built by Commercial Solvents at Peoria, Illinois.

A pilot plant has been in operation at Sterlington, Louisiana for the past year and has been the basis for designing a commercial unit. The engineering department of the company is handling the design and engineering requirements for the plant.

Advantages of the Stengel process over conventional processes now being used are said to include: (1) lower capital investment; (2) reduced operating expenses; (3) shorter time required to build the plant due to simplification of construction and process; (4) particle size can be changed and "custom-sized" to meet customers' needs.

Field tests indicate that the product flows well in drills and spreading units.

Mr. Woods said "design and engineering work on the plant are going forward and completion of the plant is expected by July 1, 1953. The material will be marketed through fertilizer manufacturers."

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A.A.E.E. Meets in Dec.

Although details are not complete for the 64th annual meeting of the American Association of Economic Entomologists to be held in the Bellevue-Stratford Hotel, Philadelphia, plans are being made for the event which is expected to attract the largest attendance in the group's history. Dates of the meeting are December 15-18, inclusively, according to Dr. E. F. Knipling, assistant chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, D. C. president of the A.A.E.E.

In charge of the program is Howard Baker, U. S. D. A. entomologist, Washington, D. C., who heads the committee working on the general plan.

•

Fertilizer Safety Section

The National Safety Council, Chicago, is expected shortly to announce organization of a special section for the fertilizer industry. Final details incidental to securing Council acceptance were worked out at the recent meeting of the Fertilizer Industry Safety Committee at White Sulphur Springs, W. Va. Plans were also completed at White Sulphur for the industry's participation in the 40th National Safety Congress and Exposition which will be held in Chicago, October 24.

The Congress program for Wednesday, October 23, will feature a talk on "Multiple Shot Blasting in Fertilizer Storage," by Mark Withey, Trojan Powder Co., Arlington Heights, Ill. To illustrate the subject further, a demonstration on multiple shot blasting will be presented the following morning in the Chicago Heights plant of the International Minerals and Chemicals Co. Dr. J. L. Rosenstein, well-known industrial safety psychologist and author of many publications on the psychology of foremanship, will speak on the human side of safety. The Wednesday program will also include a talk on "Fire Prevention Through Design," by G. D. Blair, fire prevention engineer for Ebasco Services, Inc., New York, N. Y. Mr. Blair will follow this up on Thursday with a discussion of fire prevention through maintenance.

The Thursday afternoon session will include many other topics of interest to those responsible for accident prevention programs. T. J. Clarke, personnel director for G. L. F. Exchange, Ithaca, N. Y., will tell "How to Conduct a Safety Meeting," and E. O. Burroughs, Jr., manager of the insurance department of Royster Guano Co., will speak on "Housekeeping in Fertilizer Plants." Herbert T. Walworth, industrial hygienist for Lumbermen's Mutual Insurance Co., Chicago, Ill., will attempt to clear the air on the problem of "Gas and Dust Control."

J. S. Fields of Phillips Chemical Co. is chairman of the Fertilizer Industry Safety Committee, and Vernon S. Gornto, Smith-Douglas Co., Norfolk, Va., is secretary.

•

Powell Offers Heptachlor

Heptachloro-tetrahydro-4, 7-methanoindene, newest of the chlorinated compounds and generally referred to as "Heptachlor," is now available to insecticide manufacturers and packagers as dust, emulsion and wettable powder concentrates, according to an announcement by Dr. Alfred Weed, vice-president in charge of sales, John Powell & Co., New York.

This announcement was made in conjunction with approvals and recommendations resulting from extensive testing of heptachlor for control of the cotton boll weevil during 1950 and 1951. Other insects, for the control of which the material is approved, are the cotton flea hopper, tarnished plant bug, rapid plant bug, garden web-worm and certain cutworms.

Heptachlor, a development of the Velsicol Corporation, is being prepared by Powell in the form of special concentrates designed for easy and trouble-free formulation into finished dusts and sprays.

Dr. Weed advises that the Powell Technical Service Department has issued a new bulletin covering the processing of heptachlor into finished formulations. This bulletin is available from Powell's New York office at One Park Avenue.

•

Joins Baughman Co.

KENNETH C. KORTE

Kenneth C. Korte, formerly with Philip Morris, Montgomery Ward and Executive Service, Inc. in sales, advertising and personnel capacity, has been appointed advertising manager of the Baughman Manufacturing Company, Jerseyville, Illinois.

Baughman, pioneer producer of spreader bodies for agricultural, highway maintenance and ice control use, also manufactures a wide variety of self-unloading bulk material bodies and conveying equipment in use throughout the world.

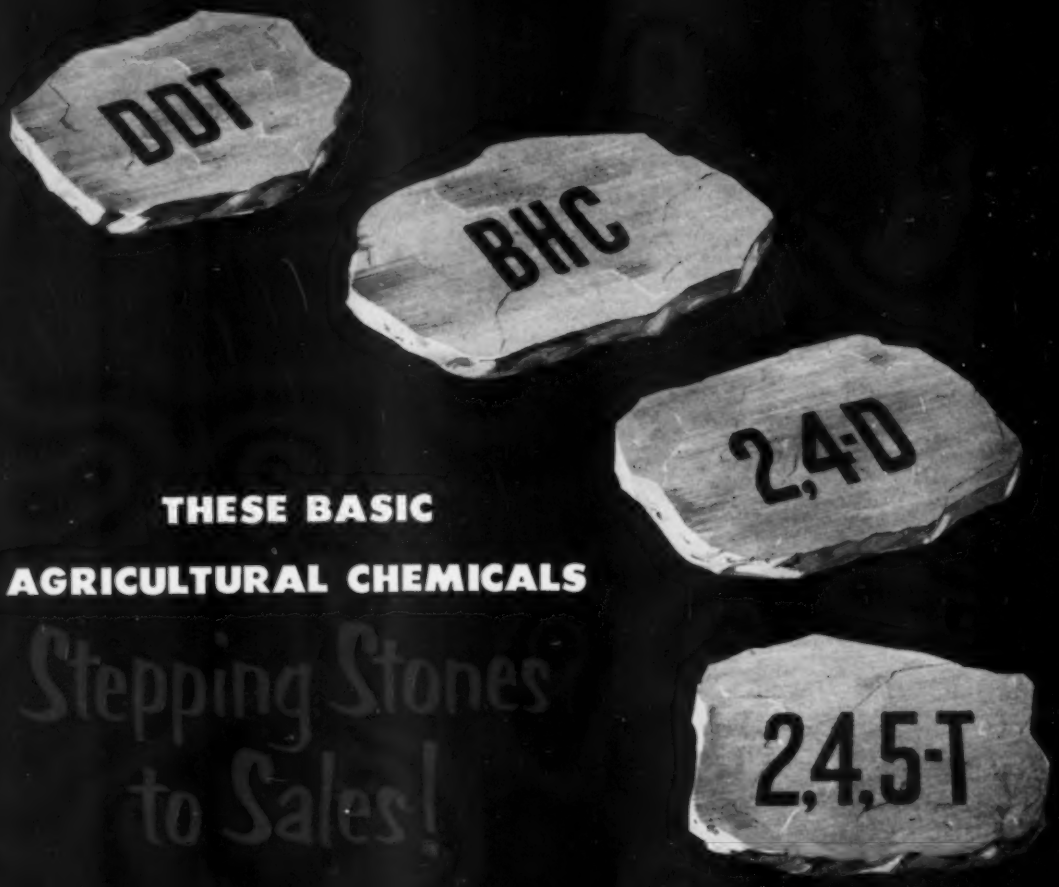
Mr. Korte attended Shurtleff College at Alton, Illinois and did graduate work at the University of Wisconsin before entering business.

The Baughman advestising account, formerly split between two agencies, is now handled by Batz-Hodgson-Neuwoehner Advertising Agency of St. Louis.

•

To Study Fertilization

J. C. Noggle has been named as graduate assistant in the program of research on magnesium fertilization being conducted at the University of Arkansas under a grant from the International Minerals and Chemical Corp. He formerly attended the Arkansas Polytechnic Institute at Russellville and taught agriculture to veteran's classes for three years.



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DIAMOND ALKALI CHEMICALS

Toxaphene Production Up

Hercules Powder Company has announced the postponement of completion of its plant for the manufacture of toxaphene, chemical base of agricultural insecticides, at Henderson, near Las Vegas, Nevada. Technical improvements have increased output of Hercules toxaphene plants at Brunswick, Georgia, and Hattiesburg, Mississippi to such an extent that the capacity of the two existing plants now is greater than the estimate of the combined capacity of the three plants a year ago.

With further developments in chlorinated materials, it is likely that construction of the Henderson plant will be resumed at a later date.

•

Putnam Leaves Michchem

Sherman Putnam, sales manager for Michigan Chemical Co., Saint Louis, Michigan, has resigned his position. John L. Giles, vice-president and assistant to the president, Roland P. Place, is covering sales management for the time being until a successor to Mr. Putnam is named. Mr. Putnam had not announced his future plans at press time.

•

Completes 40 Yrs. at Swift

Arthur F. Miller, Head of the Plant Food Department of Swift & Co., Chicago, recently completed 40 years of service with the company. He has long been prominent in the fertilizer industry and is credited with originating the "Vigoro" brand of fertilizer.

•

New Plant For Union Oil

Union Oil Co. of California will begin construction on a new ammonia plant soon, it has been learned. Annual capacity of the plant will be 31,000 tons. The plant will be located at the company's Wilmington, California, refinery near Los Angeles.

A certificate of necessity totaling $5 million has been issued by the Defense Production Authority toward the building of the new plant which was designed by Homer Reed of the Research Division of Union Oil Co.

$100 Million Check for Dow Expansion Program

One of the largest offerings of securities of a chemical company ever made to the public was completed July 22 when Earl W. Bennett, (seated, right) chairman of the board of The Dow Chemical Company received from Charles W. Kennard, (seated, left) partner in the investment banking firm of Smith, Barney & Co., a check for $100,425,000. The check represented the net proceeds from the recent sale of $100,000,000 principal amount of Dow 3% convertible subordinate debentures due 1982, the biggest financing on record to be effected by means of this particular type of security. The check was received at the New York City offices of Smith, Barney & Co. Observing completion of the transaction are (above, left to right) Calvin A. Campbell, vice-president and general counsel, Dow Chemical; Carl A. Gerstacker, Dow treasurer, and Leland I. Doan, Dow president. The funds will be used by Dow in connection with its construction program which contemplates the expenditure of approximately $200,000,000 during the next two years.

C S C Consolidates Two Divisions

JACKSON MAPLE LINES

The consolidation of two divisions of Commercial Solvents Corporation, the Industrial Chemicals Division and the Animal Nutrition Division, has been announced by A. K. Hamilton, vice-president of Product Divisions.

W. Ward Jackson, previously in charge of the Industrial Chemicals Division, will become general manager of the new Industrial Chemicals and Animal Nutrition Division. However, this division will have two separate sales departments, one handling industrial chemicals and the other animal nutrition products.

Frank E. Maple, previously assistant general manager of the Industrial Chemicals Division, has been appointed general sales manager of the Industrial Chemicals Department.

George O. Lines will continue in his present position. He will be general sales manager of the Animal Nutrition Department.

Mr. Jackson, Mr. Maple and Mr. Lines have their headquarters in the company's new general offices at 260 Madison Avenue, New York 16, N. Y.

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Poulsen R.T.R.* **UNI-BLENDER**

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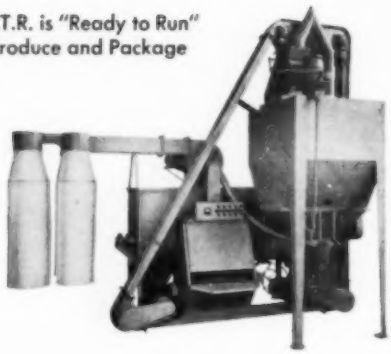
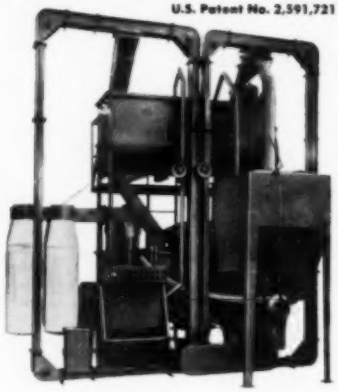
—Produce and Package

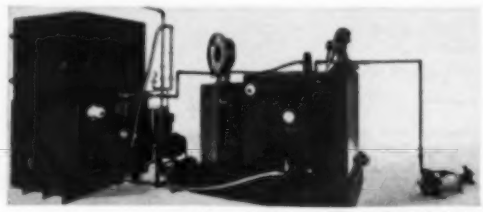




STANDARD TYPE R.T.R. Uni-Blender Compounding Plant is designed to mix and blend dust concentrates with diluents to produce and package ready to use, field strength insecticides of consistently uniform quality. The complete plant requires only 9'x12' of floor space and 13' of head room. Produces up to four 40 cu. ft. batches per hour *with only one operator*. Users report production of 29,000 pounds in 5 hours with two operators.

DUAL TYPE R.T.R. Uni-Blender Compounding Plant is designed to perform a dual function . . .(1) to formulate dust concentrates . . .(2) to produce field strength insecticides. Users claim this provides the most economical insecticide formulating equipment available. Handling 40 cu. ft. batches, the complete plant requires only 11'x11' of floor space and 16' of head room.

Both Standard and Dual types are available for immediate shipment.



Uni-Blender Liquid Formulating Plants provide for liquefying and injection of specific technical grade toxicants required for the formulation of numerous concentrates and liquid sprays.

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Engineers and Manufacturers

Materials processing and materials handling equipment

Lahey, Cyanamid, Retires

R. W. Lahey, manager of American Cyanamid Company's packaging and materials handling department, retired on June 30th after serving with the company since 1929. He was also chairman of the label committee. Mr. Lahey is a graduate of Columbia University in 1917 with a B. S. degree and holds membership on several committees of both the American Society for Testing Materials and the Manufacturing Chemists Association. He was a Second Lieutenant in the First World War, and served on the War Production Board and in the Office of Scientific Research and Development during World War II.

•

C & C Personnel Changes

H. B. McClure, vice-president of Carbide and Carbon Chemicals Company, a division of Union Carbide and Carbon Corporation, has announced the appointments of John Conway, J. A. Field and W. A. Woodcock as assistant managers to Dr. R.L. Baetman, manager of the company's fine chemicals division. Mr. Conway was formerly product manager in charge of nitrogen, chlorine, and sulfur compounds; Mr. Field was product manager for intermediates, and Mr. Woodcock, product manager for plasticizers, solvents and resin stabilizers.

•

"EPN" Now Offered as Dust

'EPN," insecticide developed by Du Pont agricultural research, has now been approved by the USDA as a dust concentrate and is being made available this summer for the first time in that form, the company has announced. Previously EPN has been available only as a wettable powder.

Use as a dust makes it possible to control a number of serious crop pests, against which EPN was not recommended in spray form. As a 3%dust, it is proposed for use against yellow-striped army worm on cotton, while at a 2% rate it has shown much promise against both the Atlantic and Pacific species of mites in California cotton fields.

EPN dust formulations will also control European corn borer on both field and sweet corn, sugar beet webworm in the important sugar beet fields of the west, onion thrips, russet mite on tomatoes, and plum curculio on peaches, du Pont has announced.

The new concentrate will be sold only to manufacturers and agricultural chemical processors, for formulating into finished dust mixtures for crop use. It will be packaged in 20-pound bags, packed two to a carton.

•

Slate on Conn. Program

William L. Slate, director emeritus of the Connecticut Agricultural Experiment Station, will be principal speaker at the Station's annual Field Day, to be held Aug. 20, at the Mt. Carmel Experimental Farm. He has chosen for his subject, "The Farmer and the New Frontier," a discussion of how today's farmer and modern research work together to create a better agriculture.

Station officials state that plans have been made for the biggest field day the Station has ever held, with demonstrations and exhibits showing the work being done by the staff. Emphasis this year is to be on tobacco growing. Field day activities begin at 10 a.m. August 20.

Mr. Slate, scheduled to speak directly following lunch, was director of the Connecticut Station from 1923 to 1948, and has brought the station's official welcome to field day audiences on 25 occasions. In all, he has been officially associated with agricultural science in Connecticut for 35 years. He began his career in the state in 1913 when he became agronomist at the Storrs Agricultural Experiment Station. He continued in this post until 1922, when he was named vice-director of both the Connecticut and Storrs Stations. He was appointed director of both stations in 1923.

•

New BEPQ Bee Division

Establishment of a division of Bee Culture and Biological Control in the U. S. Department of Agriculture's Bureau of Entomology and Plant Quarantine, was recently announced by Avery S. Hoyt, bureau chief.

Mr. Hoyt stated that all of the bureau's activities with bees and other beneficial insects would be consolidated into this single division. The unit will also be responsible for research relating to biological control of insect pests and weeds, including diseases of insects.

J. I. Hambleton, for 30 years head of the Division of Bee Culture, is head of the new division. Willis J. Nolan, formerly first assistant to Dr. Hambleton, will head the section of Bee Culture Research and Theodore R. Gardner, the section of Biological Control.

•

Shift Kolker Exports

Diamond Alkali Company has announced that export sales activities of Kolker Chemical Works, Inc., a subsidiary, have been transferred to Diamond's Export Sales Division in New York. Kolker, acquired by Diamond in August, 1951, specializes in organic chemicals for agriculture and industry.

S. B. Honour, who handled export sales for Kolker, will continue in the capacity for Diamond, assisting S. S. Savage, director of export sales.

•

Freeport Names New VP's

Freeport Sulphur Company, New York, has elected four new vice presidents, according to an announcement by Langbourne M. Williams, Jr., president.

The new officials are Z. W. Batlett, assistant general manager of Freeport's southern operations with offices in New Orleans; J. C. Carrington, formerly assistant to the president in New York; H. C. Peterson, head of the company's oil and gas division in Houston; and K. T. Price, manager of its Louisiana division with headquarters in Port Sulphur, La.

Freeport is developing two new sulphur mines in Louisiana at Bay Ste. Elaine and Garden Island domes and one in Texas at Nash dome. The company also is engaged in a program of exploration for and development of oil and gas.

Soluble plant-nutrient chemicals by Monsanto are being formulated into fertilizer solutions, providing direct feeding to plants of nitrogen, phosphorus and potassium without harm to leaf crops. Immediate solubility, when applied directly to plants, is a characteristic of solutions of Di Ammonium Phosphate, Mono Ammonium Phosphate, Mono Potassium Phosphate and Phosphoric Acid 75%. They also are available for dry applications.

Shipped in appropriate containers, these chemicals are being used by fertilizer manufacturers in processing specific formulations for soil dressing or direct-to-plant applications. Standard farm equipment is used for either spray or solid application. For information concerning this available supply of plant-nutrient chemicals, contact any District Sales Office, or write MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700-B South Second Street, St. Louis 4, Mo.

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DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto Canada Limited, Montreal.

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Mono Potassium Phosphate (Crystals)	—0—	51.6%	34.2%
Di Ammonium Phosphate (Crystals)	21.0%	53.85%	—0—
Mono Ammonium Phosphate (Crystals)	12.2%	61.61%	—0—
Phosphoric Acid (75.0%) (Liquid)	—0—	54.5%	—0—

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PENTAHYDRATE BORAX
COMPOSITION Contains a minimum of 44% B_2O_3 or approximately 121% equivalent Borax.
ADVANTAGE More economical because the Borate in this form is more concentrated.
PURPOSE To correct deficiency of Boron in the soil.
RECOMMENDED USES As an addition to mixed fertilizer, or for direct application to the soil.
FOR CORRECT APPLICATION Consult your local County Agent or State Experimental Station.
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MURIATE OF POTASH
IMPORTANCE Muriate of Potash is a vitally important ingredient which provides the soil nutriment so essential in the formulation of good mixed fertilizers.
PURPOSE To help resist plant diseases and enhance the productivity of crops.
TO ASSURE EFFECTIVE RESULTS Specify "Trona" Muriate of Potash . . . made by the pioneer producers of Muriate in America.
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Denver New Shell HQ

Shell Chemical Corp., which recently purchased Julius Hyman & Co., will centralize all of its agricultural chemical activities in Denver, Colo., the company has announced. Denver will become marketing headquarters of all of the firm's agricultural products except fertilizers.

The Julius Hyman & Co. division of Shell Chemical Corp. has been set up and will market aldrin and dieldrin, manufactured by Julius Hyman & Co., Shell's soil fumigants, "D-D" and "CBP-55" and its line of spray oils.

F. W. Hatch has been appointed vice-president of Julius Hyman & Co. and manager of the new division. He has been connected with the sales of aldrin and dieldrin since Shell began marketing the two insecticides in 1950.

Other appointments announced by Shell include: L. F. Stayner of Shell's New York sales staff is now sales manager of the Julius Hyman & Co. Division. R. E. Joyce heads the exports sales and development department in New York; and W. E. McCauley, formerly of Julius Hyman &Co., will be manager of the product development department with L. G. Smith as assistant manager. The technical service department of the new division will be managed by Al Lykken, with M. M. Rosson as assistant manager.

■

Bankruptcy Hearing Set

A hearing for creditors of the bankrupt Chemical Corporation of Colorado, Denver, was scheduled for July 30 by the United States District Court for the District of Colorado, following the filing on June 19, of a voluntary petition of bankruptcy by the corporation.

According to the District Court's information, liabilities listed by the corporation total some $656,456, with most of the creditors in the chemical industry, numbering about 200. Spokesmen for creditor companies said that liquidation of the assets of Chemical Corporation of Colorado would bring an estimated 13¢ to 20¢ on the dollar.

Chemical Corp. of Colorado had marketed insecticidal products under the trade name of "Colorado .44" for the past several years. President of the firm was M. H. Roseman.

■

New L.A. Unit Planned

Design and engineering work are underway, and Certificates of Necessity have been issued by the Defense Production Administration, for a new plant in Los Angeles, California for Carbide and Carbon Chemicals Company, according to a recent announcement by Dr. J. G. Davidson, president.

The company, a Division of Union Carbide and Carbon Corporation, plans to produce polyethylene resins at his new plant. The plant also will produce ethylene glycol. The project, according to the Certificates of Necessity, will involve an eventual investment of upwards of $36 million. It is being designed to produce from 50 to 60 million pounds of polyethylene and from 5 to 10 million gallons of ethylene glycol a year.

It's Time to CLEAN HOUSE!

Complete Supplies for APPROVED SANITATION of Grain-Storage Facilities

Fumigants, Residual Sprays, Rodenticides, Protectants

All recommended grain fumigants are standard formulas. Don't be misled by extravagant claims.

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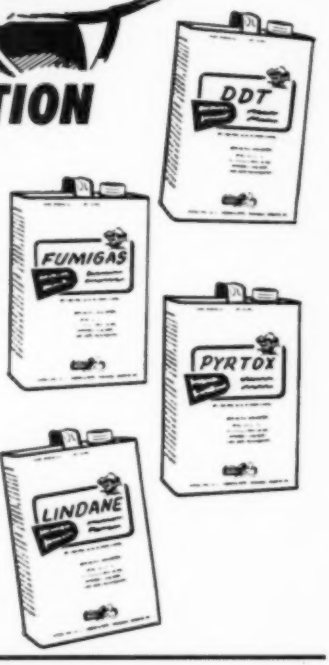

Another THOMPSON-HAYWARD Product

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Omaha • Denver • Tulsa • Minneapolis • Oklahoma City • N. Little Rock • San Antonio • Des Moines • Davenport • Lubbock, Texas

Lammot du Pont Dies

Lammot du Pont, 71, former president of E. I. du Pont de Nemours & Company and youngest of the three brothers who led the twentieth century development of the 150-year-old chemical company, died July 24.

He was the eighth member of the du Pont family and the third brother in succession to become head of the company founded by his great-grandfather, in 1802.

The eldest of the three brothers, Pierre S. du Pont, was the company's president from 1915 to 1919. Irenee du Pont, a second brother, succeeded Pierre and was president until 1926. To Lammot du Pont, youngest of the trio, fell the task of rounding out and coordinating what had become one of the most complex communities of chemical manufacturing in the Americas.

During his presidency, from which he retired in 1940, expenditures for the operation of Du Pont research laboratories were increased almost sevenfold. This unprecedented expansion, effected in the main during general business depression, carried the company far ahead among industrial organizations pioneering in new scientific fields.

•

Application Group to Meet

Developing the theme of "Keeping Up With King Corn," the National Joint Committee on Fertilizer Application will hold its annual meeting at the Netherland Plaza Hotel, Cincinnati, Ohio, November 17. The meeting will be in connection with the meeting of the American Society of Agronomy.

According to advance information on the program, talks will be presented by L. L. Huber, Pennsylcania Agricultural Experiment Station; J. D. Sayre, Ohio Agricultural Experiment Station; and George V. Taylor, Spencer Chemical Co. A panel is scheduled also with H. B. Siems, Swift & Co., Chicago, moderator. Members of the panel will include Dr. Firman E. Bear, Rutgers University, New Brunswick, N. J.; M. L. Jackson, Wisconsin Agricultural Experiment Station; W. C. Johnstone, Kentucky Bankers Association and B. A. Krantz, U. S. Department of Agriculture.

•

Dieldrin for Fly Control

The Julius Hyman Division of Shell Chemical Corp. has announced the availability of dieldrin for the control of houseflies, mosquitoes, and other agricultural and public-health pests. The dieldrin label has been accepted by the U. S. Department of Agriculture, allowing the use of dieldrin for this purpose, according to F. W. Hatch, vice-president of the Hyman Division.

Mr. Hatch, in announcing the availability of dieldrin, says that the "strip method" of controlling flies in dairy barns and other farm buildings can be used successfully with the product. Screens are treated with dieldrin and hung in strips so that flies contact the toxicant and are killed.

A marked reduction in fly population may be noted within 24 hours and treated strips are effective for several weeks, it is claimed.

COPPER SULPHATE

Crystals - Superfine - Powdered

BASIC COPPER SULPHATE

•

ZEE-N-O

(Neutral Zinc)

The High Test Nutritional Basic Zinc

56% Zinc as Metallic

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MANGANO

(Neutral Manganese)

The High Test Nutritional Manganese

55% Mn as Metallic

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W. R. E. ANDREWS SALES, INC.

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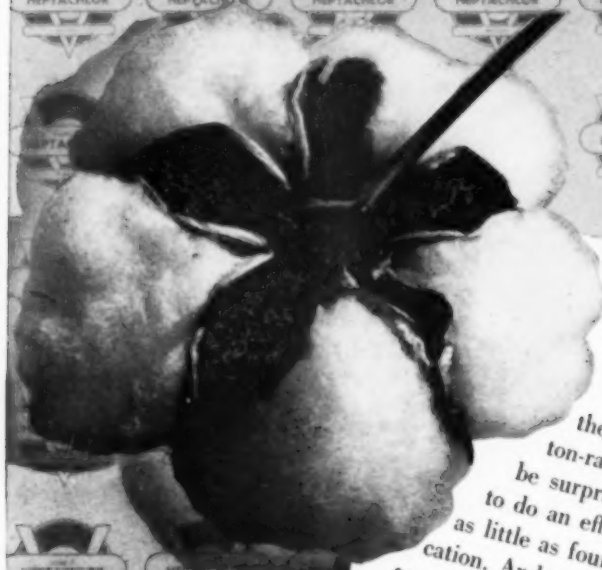
Since 1926

Agricultural Chemicals Specialists

Now New HEPTACHLOR Control of Cotton Insect Pests



Here's new, two-fisted control of boll weevils and other bothersome costly pests. It's new Heptachlor, fully approved for cotton insects by the Federal Government and all cotton-raising states. So powerful, you'll be surprised how little you have to use to do an effective job . . . on boll weevils, as little as four ounces to the acre per application. And such applications at the same time control a wide variety of other cotton pests. Make Heptachlor tops in economy.

Easy, too. Heptachlor can be applied in wettable powders, emulsifiable concentrates or free-flowing dusts. So, for an easier, bigger, cotton yield this year, get Heptachlor more economical cotton insect control. Contact your dealer, county agent, or write to us right away for complete Heptachlor facts and information.

ALSO CONTROLS

Cotton Flea Hoppers
Tarnish Plant Bugs
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REPRESENTATIVES IN PRINCIPAL CITIES

Opens Iowa Div. Plant

Warren-Douglas Chemical Co., Inc., Omaha, Nebr., has opened a new warehouse at its Iowa Division in Des Moines. Complete stocks of agricultural and industrial chemicals will be kept in the new building.

The Iowa Division was formed in 1951 and the new building (above) was erected only recently. Officers are H. D. Warren, president; Allan R. Kuntzelman, vice-president and general manager; and Norman W. Boyer, secretary-treasurer.

•

Ad Agency Adds Division

Sterling Advertising Agency, New York, has established a new Industrial Division in an expansion program, the firm has announced. Donald M. Martin, formerly advertising manager of General Dyestuff Corp., will head the new division with Paul B. Slawter, Jr., formerly vice-president of the House of J. Hayden Twiss, New York.

•

New Book Reviews

Chemical Engineering Technology by B. E. Lauer and R. F. Heckman. Published by Reinhold Publishing Corp., New York. 496 pages, 6 x 9 inches, cloth binding, price $6.00.

This text is designed primarily for the chemical engineer and student, presenting many important considerations involved in the selection of the most suitable method for performing various operations encountered in the chemical and process industries. However, it is also of interest to persons concerned with materials handling, in view of the chapters concerning (1) assembly of materials, such as transportation and storage, (2) preparation of materials for marketing and packaging, including discussions on bulk packaging equipment, and (3) other treatments, such as discussions of the technique for prevention of caking.

Other chapters discuss size reduction and classification, distribution of energy, chemical reaction, and the separation and purification of materials.

• • •

Phosphates in Agriculture by Vincent Sauchelli. Published by The Davison Chemical Corp., Baltimore, Md. 176 pages, 7¼ x 10½ inches, cloth binding, price $2.50.

According to the preface, the text is designed primarily to serve the Davison organization, however, the text will be of interest to anyone concerned with the agricultural uses of phosphates. Twelve chapters dealing with the geology, mining, processing, granulation, and fixation of phosphates, comparison of phosphates with superphosphate, radiophosphorus, losses and replenishment by fertilizers and other data, are included in this book. Discussions of particular interest include those on phosphorus in plant nutrition, influence on root development and effect on soil structure.

Go the scientific way...go **MGK**

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You may want complete formulas . . . ready to put right into your aerosol bombs or your retail packages. You may want combinations of insecticides and synergists that leave you only the minimum of processing to do. You may want to do most of the processing yourself and to you we offer the purest toxicants and synergists in their primary forms. MGK has the *best* of whatever you want. The emblem "MGK" is satisfying assurance of high efficiency and scientific production in insecticides and insecticide ingredients. Let this single experienced source help you make better products for less money. For complete information about MGK prices write 1703 Southeast Fifth St., Minneapolis, Minn.

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Sacred beetle of ancient Egypt. Model for carved stone amulets and scarabs.

THE PIONEERS OF PYRETHRUM AND ALLETHRIN

Good insecticides protect America's health and harvest.

McLAUGHLIN GORMLEY KING COMPANY

Announcing...

dieldrin

for outdoor control of...

adult houseflies and mosquitoes, mosquito larvae, salt-marsh sand fly larvae, ticks, chiggers, fleas

DIELDRIN has been accepted by the U. S. Department of Agriculture for the outdoor control of the above pests. Its application is limited to experienced personnel, including Pest Control Operators, public health organizations and mosquito abatement districts.

Dieldrin has been thoroughly field-tested under a variety of conditions with excellent control results on these important public health pests. Because of the high lethal power of dieldrin, it is effective in economical dosages.

Dieldrin is an insecticide with long residual action. One application against houseflies, for example, is effective for several weeks in exposed areas and for several months in protected areas.

The dieldrin spray is prepared by mixing an emulsible concentrate in water. It is applied by conventional spraying equipment.

JULIUS HYMAN & COMPANY DIVISION

SHELL CHEMICAL CORPORATION

Chemical Partner of Industry and Agriculture

P. O. Box 2171, Denver 1, Colorado

Advances G. K. Whyte

GEORGE K. WHYTE

R. N. Conners, vice-president and general sales manager, Chase Bag Co., has announced that George K. Whyte is the new manager of the Chase factory and sales office in St. Louis. Mr. Whyte, graduate of the University of Illinois, has had ten years of selling experience with Chase. Formerly sales manager in St. Louis, Mr. Whyte assumed his new post June 1st, 1952.

•

Hough Co. Wins Prize

Frank G. Hough Co., Libertyville, Ill., was recently presented the Putnam Award "for the best use of industrial advertising . . . and the best documentation of such use . . . in making more effective the selling of products or services to industry." The award was made at the annual convention of the National Industrial Advertisers Association in Chicago.

Top honors were accorded the Hough company with a $1,000 presentation being made to Raymond P. Wiggers, Hough's advertising manager and an award of $750 to Ray B. Thomas, account executive of Hough's agency, Ervin A. Abramson, Milwaukee, Wis.

The Hough Company won first place in 1950 also, which makes it and its advertising agency, the first in history to win the Putnam Award twice.

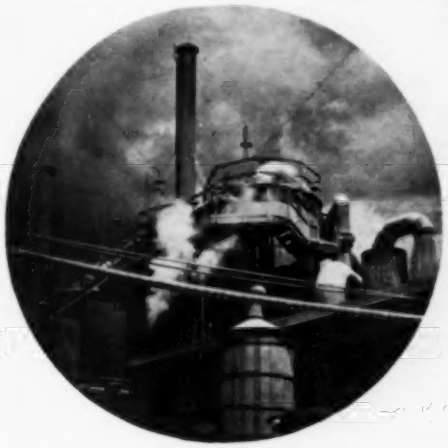
•

Texas Program Under Way

A new research program, sponsored by the Texas Technological College Research Foundation, has been initiated at PanTech Farms, near Amarillo, Texas. Although the primary purpose of the program is to concentrate on control of the greenbug, *(Toxoptera Graminum)*, small grain insect pests will also be studied. A recent additional assignment is the study of fertilization and irrigation practices in Panhandle wheat production.

Dr. Donald Ashdown has been appointed director and Eldon A. Cleveland assistant research entomologist. Dr. Ashdown was formerly at Oklahoma A & M college, and Mr. Cleveland was with California Spray Chemical Corp. in Missouri.

This research program is sponsored by a number of railroads, wheat grower associations, grain elevators and milling companies. The program is to be coordinated with similar programs of the Texas A & M experiment station and the Bureau of Entomology and Plant Quarantine.



Second unit of Monsanto-designed sulfuric acid plant built for Armour & Company at Bartow, Florida.

Sulfuric acid for the free world

Approximately 40 per cent of the free world's contact sulfuric acid is produced with Monsanto Vanadium Catalyst and in Monsanto-designed plants. More than 300 of these economical and efficient sulfuric acid plants are in service. They are located in 26 countries throughout the world.

Monsanto-designed sulfuric acid plants, using Monsanto Vanadium Catalyst, do not depend on elemental sulfur alone. They operate with all known raw materials. Monsanto designs, which have many exclusive features, are based on nearly a third of a century of experience in design, construction and operation of sulfuric acid plants.

If you are considering a future sulfuric acid plant, you are invited to consult Monsanto engineers without cost or obligation to you. MONSANTO CHEMICAL COMPANY, Engineering Sales Department, 1700 South Second Street, St. Louis 4, Missouri.

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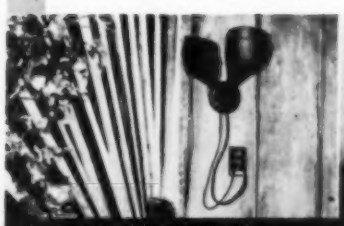
FORMULATORS!

Only ORTHO Lindane* does all these jobs—so well!



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human parasite control

protects food processing plants

livestock pest control

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EASY FORMULATIONS —easily handled—easily formulated as a spray or dust. ORTHO Lindane particles are dry, free-flowing. Easily ground to micro-size.

STABILITY —chemically stable.

MANUFACTURING "KNOW-HOW" —made exclusively by the original manufacturers of Lindane in the U.S.A.

*ORTHO Lindane, a real profit-maker, is a truly amazing insecticide offering high potency, rapid action, and residual control. Kills more than 200 varieties of insects by contact, vapor action, and stomach poison.

always — you profit with ORTHO

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T.M. REG. U. S. PAT. OFF.: ORTHO

World leader in scientific pest control

ORTHO

SCIENTIFIC PEST CONTROL

Elm Disease Control

Control of Two Elm Diseases Outlined in USDA Publication:

Ways to prevent and control the two diseases of elm trees—Dutch elm disease and elm phloem necrosis—are outlined in the new U. S. Department of Agriculture Leaflet 329.

Most elm species, but particularly the American and winged elms growing in the east, midwest, and the south, are plagued with one or the other, or both, of these diseases. They continue to spread, threatening to become serious everywhere.

Insects spread both diseases. Elm bark beetles carry the Dutch elm fungus from tree to tree, and a leafhopper spreads the virus that causes phloem necrosis.

Control of these insects is said by Department entomologists and forest pathologists to be the best way now known to curb the diseases. They recommend timely and thorough spraying of elm trees with DDT. Bark beetles can be killed by spraying the bark of elms in the late winter or early spring before they have leafed out, followed by a DDT foliage spray about 90 days later. Early season burning or spraying of bark beetle breeding places—dead trees, broken limbs, logs, and felled elms—helps control Dutch elm disease.

Foliage sprays containing DDT are recommended for leaf hopper control; the first to be applied when the leaves are full grown, but before July 1. A second foliage spray should be applied in mid-August.

Pruning away diseased wood before the trunk of the tree becomes infected may in some cases save trees from Dutch elm disease, but the fungus, once established, spreads rapidly through the tree, and the elm is often beyond help before the disease is recognized.

How these diseases can be detected and how the sprays should be mixed and applied, are also described in Leaflet 329, "Control of Dutch Elm Disease and Elm Phloem Necrosis." A copy of this publication is available free from the Office of Information, U. S. Department of Agriculture, Washington 25, D. C.

WASHINGTON

(Continued from Page 57)

ceiling price for sales of a particular fertilizer to farmers is the highest price at which he delivered it during the base period (December 19, 1950 through January 25, 1951) to a purchaser of the same class. This is regardless of whether or not at least 10 percent by dollar volume of reseller's total base period deliveries to that class of purchaser were at that price, which is required under the GCPR for manufacturers' and wholesalers' sales.

The amendment removes such sales to the ultimate users, including farmer purchasers, from coverage of the 10 percent rule.

Also, not now applicable to sales of fertilizers to ultimate users are rules set forth in Section 3(b) which in some cases permit the use of price list prices instead of actual delivered prices during the base period.

Under Section 6 of the GCPR, a seller prices new products by reference to a competitor's price and reports his action to OPS. As a wholesaler, he must wait 30 days before selling at his proposed ceiling. If he is a retailer he may sell as soon as his report is mailed.

Being a retailer under the terms

Better Protection... Better Yields
4 LBS. NET WEIGHT
PHELPS DODGE REFINING CORPORATION
NICHOLS TRIANGLE BRAND
BASIC COPPER SULPHATE
For BETTER and SAFE Control of
BLIGHT
TRIANGLE BRAND
COPPER SULPHATE
Triangle Brand Copper Sulphate is dependable . . . safe and costs less. Yet, by actual field test, it gives greater yields! That's why growers actually use more Triangle Brand Copper products on their crops than any similar plant protection material. Don't be satisfied with "substitutes." Get the best—always demand Triangle Brand.
FREE!
Valuable booklets: "Bordeaux Mixture," "Bordeaux Controls Late Blight on Tomatoes," "Better Potato Yields," "Basic Copper Sulphate."
PHELPS DODGE REFINING CORPORATION
40 Wall Street, New York 5, N. Y.
230 N. Michigan Ave., Chicago 1, Ill.

Books and other Aids...

Handbook of Agricultural Pest Control

by S. F. Bailey and L. M. Smith

190 pages, 3.25 in U.S.A.

A practical handbook for the custom spray operator, the pest control operator, farm advisor, agricultural chemical salesman and field worker. This handbook covers the agricultural chemicals (insecticides, fungicides, herbicides, plant hormones and nutrient sprays, defoliants, etc.), their rates of application, useful formulas, as well as chapters on fumigation, spray machines, toxicology, dusts and dusting, aircraft, and mosquito control.

The book is pocket sized (5 x 7½ x ½ inches), bound with a flexible leatheroid cover, for convenient, practical use. It includes more than 100 tables for practical everyday use. Conversion formulas and examples illustrate application to specific uses.

Insect Control by Chemicals

by A. W. A. Brown

817 pages, price $12.50

817 pages. This text traces the relation between molecular structure and toxicity; classifies the insecticides and gives their chemical, physical properties; discusses the hazards to avoid in formulation, mixing and use of compounds; and illustrates modern application equipment, including nozzles; sprayers, blowers, etc;

The Chemistry and Action of Insecticides

by H. E. Shepard

504 pages, price $7.00

This new book gives a vast wealth of information on insecticides—their chemical, physical, and toxicological aspects. Helps the chemist determine their important applications and their effects upon insects. Gives history, commercial importance, major uses.

Covers these chemical groups: Arsenical Compounds; Fluorine Compounds, Sulphur Compounds; Copper Compounds; Inorganic Substances; Nicotine; Rotenone; Petroleum, Soaps, Creosotes; Synthetic Organic Insecticides. —

Destructive and Useful Insects Their Habits and Control

by C. L. Metcalf and W. P. Flint

1071 pages, price $10.00

This authoritative guidebook covers hundreds of both useful and destructive insects—treating the inner and outer structure and form of general species—explaining their eating and breeding patterns, and life cycles—telling you how to recognize them in any stage of development.

Here are descriptions of more than 500 types of insect pests of the U. S. and Southern Canada. The insects are grouped in accordance with the crops, animals, or products they attack. For each insect you are given recognition marks and types of injury it does to man—enabling you to determine exactly *what* insect is damaging your crop, and supplying you with the most effective means of dealing with it.

Agricultural Chemicals
175 Fifth Ave., New York 10, N. Y.
Enclosed is payment. Please send the books checked.

- ☐ Handbook of Agricultural Pest Control—$3.25 in U. S.A., $3.75 elsewhere
- ☐ Insect Control by Chemicals—$12.50
- ☐ The Chemistry and Action of Insecticides—$7.00
- ☐ Destructive and Useful Insects—$10.00

(Add 3% sales tax in New York City)

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Street .....

City, Zone, and State .....

Order direct from
Agricultural Chemicals
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New York 10, N. Y.

of the amendment, the dealer need not wait before selling a new fertilizer whose ceiling price is established by Section 6 to ultimate users.

Ceiling prices still are determined on the basis of each class of purchaser.

Being a retailer under terms of today's amendment, the dealer need not wait before selling a new fertilizer whose ceiling price is established by Section 6 to ultimate users.

Ceiling prices still are determined on the basis of each class of purchaser.

N. W. CONFERENCE

(*Continued from Page 51*)

periment station to improve the quality and quantity of hay produced in these areas. Controlling of irrigation water, application of nitrogen and phosphate, and establishment of favorable grass and legume mixtures, have caused increases in yields of hay from a low of .7 tons to a high of 4.7 tons."

Reporting on defluorination studies on western phosphate rock, Lloyd H. Banning, U. S. Bureau of Mines metallurgist, Albany, Oregon, said that defluorinated phosphate rock can be used either as a fertilizer or as a stock food supplement. Because of the increasing demand for fertilizers and the necessity for development of processes other than the superphosphate process for the manufacture of phosphate fertilizers, consideration of defluorination is appropriate at this time.

Mr. Banning pointed out that electric power is used in the defluorination processes being investigated by the Bureau of Mines at Albany, Oregon. Laboratory studies have centered on a process using water vapor and heat for the defluorination reaction. By pelletizing phosphate rock with certain proportions of silica and defluorinating by heating at 1450°C. in a water vapor atmosphere, products containing less than 0.10 percent fluorine and more than 30 percent citrate soluble P_2O_5 have been obtained. When phosphoric acid is substituted for silica, the temperature of defluorination can be dropped to 1400°C. When using as little as 9 grams of phosphoric acid per 100 grams of delimed phosphate rock, products containing less than 0.05 percent fluorine and as much as 41.0 percent citrate soluble P_2O_5 have been obtained.

Pilot plant studies are in progress to determine whether these laboratory results can be duplicated in industrial type equipment, Mr. Banning said.

Commenting on the Delaney committee's report on chemical fertilizers, Dr. B. R. Bertramson, chairman, Dept. of Agronomy, Washington State College, Pullman, Washington, commended the committee for its "scholarly investigation and summary of the relationship of chemical fertilizers to agriculture."

Dr. Bertramson quoted at length from the conclusions submitted to the 82nd Congress, emphasizing particularly the statement that "No reliable evidence was presented indicating that the use of chemical fertilizers presents a hazard to man or animals. Nor does the use of chemical fertilizers in

Sulphur

Molten Sulphur flowing into the storage vat

Thousands of tons mined daily, but where does it all go?

Look around you in any grocery store and what do you see — canned goods of all kinds! Soups, vegetables, fruits, berries! Believe it or not, you're looking at merchandise that consumed a lot of Sulphur in the making.

Tin cans are made of tin plate. Tin plate is made of sheet steel. Sheet steel is made with the help of sulphuric acid—pickling, as they call it, the process that removes scale preparatory to plating. In 1951, the sheet division of our great iron and steel industry is estimated to have consumed 140,000 long tons of Sulphur in the form of sulphuric acid. That in itself makes quite a dent in our supplies of Sulphur. Add to this almost as much more for treating wire rod, plate, strip, bars, etc., and you can see that to make finished steel, regardless of form, the iron and steel industry must use lots of Sulphur in the form of sulphuric acid.

Right here is an excellent example of the interdependence of all of our industries. To produce steel requires a lot of Sulphur. To produce Sulphur and other mined products requires a lot of steel. This interdependence of industries is one of the country's sources of strength.

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.

Mines: Newgulf and Moss Bluff, Texas

accordance with good agricultural practices, appear injurious to the soil."

Dr. Frank Viets, Irrigation Experiment Station, Prosser, Washington, told the group that the Pacific northwest is concerned with the lack of three minor elements in the soil: boron, iron and zinc, although deficiencies of copper, manganese and molybdenum may be indicated in some portions of the general area.

Speaking on "Foliar Analysis Applied to Minor Elements," Dr. Viets explained that the application of plant analysis for confirmation of minor element deficiency symptoms and detection of levels associated with the onset of these symptoms is not particularly new, since minor elements have received a considerable amount of attention over the years.

"On the irrigated desert soils of central Washington," he said, "field crops showing zinc deficiency symptoms are corn, both field and sweet, beans, grain, sorghums, and possibly alfalfa. We now have about 30 crops growing on a zinc-deficient soil in the field to determine which crops show specific zinc deficiency symptoms, which ones will respond to zinc application even though deficiency symptoms are not recognizable, and which ones can get enough zinc or have low zinc requirements. We know that beans can respond with a 500 pound-per-acre yield increase when zinc is applied, even though the plants look healthy. Potatoes and alfalfa may respond similarly."

"Phosphate and Alfalfa as a Western Soil Builder" was discussed in a paper presented by J. L. Wursten, Simplot Soil Builders, Idaho Falls, Idaho. He reminded that alfalfa is the most important single crop in the development and maintenance of western agriculture and it is probably the most perfectly balanced, all-round, single feed known for livestock. Because of this, maximum yields and quality of alfalfa call for application of fertilizers; lime, potash and phosphorus. "Extensive research on the use of phosphorus has shown a total profit of $7—$13 per acre for every dollar spent for the fertilizer. In a wheat-alfalfa-potato rotation, phosphorus was applied only to the alfalfa. Results showed that the pay-off was not only in increased yield—and profit—on alfalfa, but in remarkable residual effects on potatoes and wheat as well. Alfalfa, plus phosphorus, is truly the key to western agricultural prosperity," he concluded.

•

New Lion Fertilizer Plant

Lion Oil Company has let contracts covering the design and construction of its new Barton Chemical plant to be constructed at Luling, Louisiana, T. M. Martin, company president, has announced. Chemical Construction Corporation is to be architect-designer of the installation and The Lummus Company will be the prime contractor for construction.

The new plant will be located on a 1400 acre site on the west bank of the Mississippi River in St. Charles parish about 14 miles upstream from New Orleans. It will consist mainly

new treatment for

TURF GRASS DISEASES

In accordance with discoveries in the field of turf grass diseases, H. L. WOUDHUYSEN & ASSOCIATES have developed an all-purpose emulsifiable spray concentrate for the treatment of turf fungi.

Practical testing samples of this new HLW EMULGATE "MERCADMINE" will be sent to anyone requesting so in writing.

THE NEW HLW EMULGATE

MERCADMINE

which contains

5% PHENYL MERCURY SALICYLATE
5% CADMIUM RICINOLEATE
in perfect dissolution

MERCADMINE, as all other HLW EMULGATES, is an emulsifiable concentrate which is quickly and easily diluted with water. The resultant emulsion is stable and may be applied with any kind of spraying equipment.

HLW H. L. WOUDHUYSEN & ASSOCIATES DIGBY 4-1857

Factory at Long Branch, N. J. 17 BATTERY PLACE · NEW YORK 4, N. Y.

Du Pont Announces

80% CMU

WEED KILLER

An Outstanding New Herbicide for RAILROAD RIGHTS-OF-WAY and INDUSTRIAL AREAS

Results with Du Pont 80% CMU Weed Killer are promising, as the photo indicates. CMU applied in April to the track at the right in the photo showed this result in August. The track at left in the photo was untreated.

Now you can get practical control of weeds and grass for a year or longer with one application of Du Pont CMU. It is highly effective against most vegetation and can be used at any time of year. In arid areas, it is best to apply CMU before the rainy season. Just mix with water and spray on the ground. CMU gives best results at lowest cost if applied before weeds begin to grow. However, it is effective on most plants at any stage of growth.

Many tests throughout the United States and Canada have proved that Du Pont CMU is highly practical to keep ground clear of vegetation along railroad tracks and sidings, power plants, pipelines, docks, naval yards and storage areas. Its non-flammability gives it added advantages around lumber yards, pole yards, oil-tank farms, outdoor billboards, recreation and fair grounds. And its low volatility helps prevent spray-drift damage where crops or valuable ornamentals are near the outdoor installations and manufacturing or equipment storage areas to be kept clear of weeds.

Though CMU is also being tested for weed control in crops its major applications today are for these industrial uses. For full information, write Du Pont, Grasselli Chemicals Department, Wilmington, Delaware.

DU PONT
REG. U. S. PAT. OFF.

150th Anniversary

Better Things for Better Living . . . through Chemistry

DU PONT CHEMICALS FOR THE FARM INCLUDE: *Fungicides:* PARZATE® (Liquid and Dry), FERMATE®, ZERLATE®, Copper-A (Fixed Copper), SULFORON® and SULFORON®-X Wettable Sulfurs . . . *Insecticides:* DEENATE® DDT, MARLATE® Methoxychlor, LEXONE® Benzene Hexachloride, KRENITE® Dinitro Spray, EPN 300 Insecticide, Calcium Arsenate, Lead Arsenate . . . *Weed and Brush Killers:* AMMATE®, 2,4-D, TCA and 2,4,5-T . . . Also: Du Pont Cotton Dusts, Du Pont Spreader-Sticker PARMONE® Fruit Drop Inhibitor and many others. ®REG. U. S. PAT. OFF.

On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.

of outdoor-type process units with modern one and two story buildings for administration, maintenance, warehousing and employee services. Unless construction is delayed by unforeseen shortages of material and equipment, the new facility is expected to begin operation early in 1954.

Products to be manufactured for sale include anhydrous ammonia and prilled ammonium nitrate. Nitric acid will be produced in an intermediate step. Natural gas for processed material and fuel will be supplied by The Texas Company from nearby fields in Louisiana.

■

Berger With Kraft Bag

Richard A. Berger has just joined Kraft Bag Corp., after 11 years with St. Regis Paper Company. Until recently, he was in charge of administrative work for that company's multi-wall Eastern sales department. His duties at Kraft Bag will be as administrative assistant, at the New York office, in addition to handling multi-wall sales in the State of New York, exclusive of New York City.

Safety Award to Davison

Davison Chemical Company's house publication, *The Sentinel*, has been cited by the National Safety Council as " an outstanding example of service to safety." A certificate of award has been presented to the paper's editor, A. B. Pettit, supervisor of industrial health and safety for Davison.

Publication of the *Sentinel* began in July, 1950, with the intention of making its monthly corporate-wide industrial injury report more interesting. At that time 325 copies of the report were being distributed to management and union officials. By September, at the request of the plants, circulation was increased to 700, and later, distribution to all employees of the corporation was initiated.

A unique feature of the *Sentinel* is the policy of inviting management and union officials to serve as guest editors. Several of the editorials have attracted national attention.

The *Sentinel* makes extensive use of photographs and cartoons. An "Inquiring Photographer" section includes the photographs of employees from all plants and their answers to specific safety questions. Pictures of unsafe conditions and the way they were corrected are published as are photographs of unsafe acts. Health columns by Davison Medical Directors, photographs of training activities, safety crossword puzzles, off-the-job safety, scenes of accidents, safety meetings and prize winners are among the features. Recently the magazine ran an essay contest for children of Davison employees on the subject, "Why My Daddy Should Work Safely." In addition to accident statistics, histories of accidents occurring in the plants, their causes and what was done to prevent recurrences are printed. A "Here and There" column reports the news about employees.

Articles in the *Sentinel* are simply and clearly written and appeal to all employees. Writing, editing and composing the paper is a "spare time" job. The editor is assisted by Miss Helen O'Hara, his secretary. There are 11 associate editors located in various plants.

For ammonium sulphate
you can count on Koppers!

Koppers offers a good commercial grade of ammonium sulphate—the ingredient that is so essential to fertilizer because of its high nitrogen content.

CHARACTERISTICS— Koppers Ammonium Sulphate comes in crystals with low free-acid and moisture content. The nitrogen content is guaranteed to be not less than 20.5%.

SHIPMENT— From St. Paul, Minn. and Kearny, N. J., Koppers Ammonium Sulphate is shipped in 100 lb. and 200 lb. bags—also in boxcars and trucks. From Granite City, Ill. and Midland, Pa., it is shipped only in boxcars and trucks.

KOPPERS **COAL CHEMICALS**

KOPPERS COMPANY, INC.
Tar Products Division, Pittsburgh 19, Pa.

Suppliers' Bulletins

2-Ethylhexanol Bulletin

A new technical bulletin on the bulk chemical 2-ethylhexanol has just been released by Carbide and Carbon Chemicals Company, a division of Union Carbide and Carbon Corporation. This material is used in insect sprays and disinfectants, also as a wetting agent and as a chemical intermediate.

Copies of this technical bulletin, F-7908, which lists physical and chemical properties and shipping data, are available from Carbide and Carbon Chemicals Company, 30 East 42nd Street, New York 17, New York.

•

New Clay Bulletin

A four-page technical brochure describing the properties of Barden Clay, pesticide diluent, has been published by J. M. Huber Corporation, 100 Park Avenue, New York 17, N. Y.

The brochure discusses important factors in choosing a pesticide diluent and the properties of Barden Clay in each of the categories. Tables comparing Barden Clay with other commonly-used diluents are also included. Copies of the new brochure are available on request from J. M. Huber Corporation.

•

Booklet on pH Control

A review of pH theory and its practical applications in industrial measurement and control are contained in Bulletin 430-1 issued by the Foxboro Co., Foxboro, Mass. Copies are available.

•

Spray Nozzle Booklet

Binks Manufacturing Co., Chicago, is distributing a bulletin on their industrial spray nozzles. It describes industrial spray nozzles for a broad range of commercial and industrial applications. Data given include nozzle dimensions, capacities and spray angles, the attempt being made to supply all the information a buyer or designer needs in selecting the correct nozzle for a specific application. Copies available from Binks Mfg. Co., 3122 Carrol Ave., Chicago, 12.

•

Lists Pea Weevil Controls

Latest pea weevil control methods, including the use of DDT, methoxychlor, and parathion insecticides, are brought together in a revised publication, recently issued by the U. S. Department of Agriculture. "The Pea Weevil, and Methods of Its Control," *Farmer's Bulletin* 1917, lists 5 percent DDT dusts as the generally recommended control throughout the United States for this pest. A copy of F. B. 1971 may be obtained from the Office of Information, Washington 25, D. C.

•

Chlordane Booklet Out

A new booklet, "Chlordane Controls Lawn Pests" has been published by Velsicol Corporation, Chicago. The booklet gives directions, formulations and application for control of many soil pests including white grubs, earwigs, chinch bugs, mole crickets and Japanese beetle larvae. Full details are included in the publication. Copies are available from Velsicol Corp., 300 East Grand Ave., Chicago 11, Illinois.

•

New Weed Killer Bulletin

The Agricultural Chemicals Department of the Pennsylvania Salt Manufacturing Company has prepared a new service bulletin on the uses and application of "Penite 6," a non-selective weed killer.

Instructions are given in the bulletin for top growth and aquatic weed control and also explanations of the methods to be employed in soil treatment for the complete kill of weeds and grasses.

"Penite 6" is also a control agent for termites, and formulations are furnished for preparing the proper solution for this use.

Application is a highly efficient method of debarking trees and is effective in the killing of trees and stumps. The bulletin contains recommendations for the use of "Penite 6" for this purpose.

The bulletin may be obtained from Pennsalt Chemicals, Agricultural Chemicals Department at 1000 Widener Building, Philadelphia 7, Pa.

•

Bag Clamp is Offered

Burrows Equipment Company has just announced a new and improved combination bag clamp for the "Apex" bagging scale.

The clamp comprises the entire lower half of the bagging scale, including the hopper. It is adjustable to handle both small and large bags. In two minutes time the operator can, by loosening two nuts, make adjustments to accommodate bags of 25 lb. capacity up to 200 lb. capacity.

Because of a shorter grip on bag, this new clamp needs only about one inch of material for gripping purposes, thus permitting a greater amount of material to enter bag.

This new combination bag clamp and hopper is designed not only for the "Apex" bagging scale, but also to fit virtually all other makes of bagging scales on the market. For complete information, address Burrows Equipment Company, 1316 AG Sherman Avenue, Evanston, Illinois.

•

Defoliant Literature

"Niagarathal-DF Spray," a new organic cotton defoliant, has recently been announced for sale by the Niagara Chemical Division of Food Machinery and Chemical Corporation, Middleport, New York.

The product is a liquid containing endothal (disodium 3,6—endoxohexahydrophthalate) which has been developed as an effective commercial defoliant through several years of experimental testing in greenhouse, field trial plot and full field-scale defoliation application experiments. The product was developed through cooperative research of Niagara Chemical Division and Sharples

(*Turn to Page* 120)

Ohio Pesticide Tour Set for Aug. 13

PLANS are now complete for the annual pesticide tour at the Ohio Agricultural Experiment Station, Wooster, Ohio, scheduled to be held August 13 and 14th, according to Dr. H. C. Young, general chairman of the event.

In charge of the tour itself were to be J. D. Wilson, C. R. Cutright, J. P. Sleesman, H. F. Winter, R. B. Neiswander and H. A. Runnels.

Mr. Neiswander was to demonstrate control of thrips on roses with several insecticides, and insect and mite control on dahlias in 7 treatments.

Pest control on gladiolus was to be described by Mr. Runnels who was also to discuss corn treatments for control of Sclerotinia dry rot.

Discussion of various fungicide-insecticide formulations for control of insects and diseases of cucumbers were to be presented by Mr. Wilson and Mr. Sleesman and Mr. Wilson was also to talk on soil additives and the incidence of disease.

"Nozzle and Gallonage Study on Tomatoes and Potatoes" is the title of a paper scheduled for discussion by Mr. Wilson and Frank Irons, the latter, agricultural engineer for the U. S. Department of Agriculture, Toledo, Ohio. The effectiveness of flat vs hollow cone spray patterns applied at 160 to 10 gallons per acre was to be covered. Comparisons of results with 4,3,2 and 1 nozzles per tomato row and pair of rows were to be included. A new experimental sprayer, designed and built by USDA Engineering Laboratory, Toledo, was to be demonstrated on the Ohio plots.

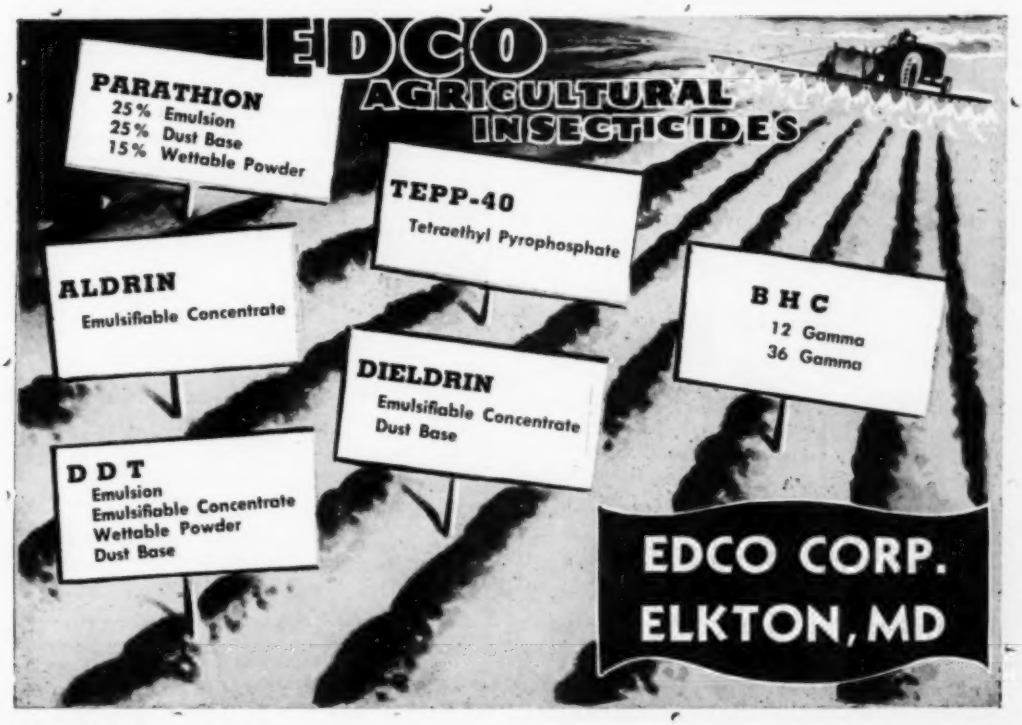
The group was to move eastward to the Frye farm where Mr. Sleesman was to present data on comparative performance of several of the newer insecticides on various vegetables. Aphis control in turnips, soil treatments for wire-worm control and residue studies with systemics on tomatoes were to be demonstrated.

Insecticide - fungicide formulations on potatoes and tank-mix series on potatoes were to be discussed by Mr. Wilson and Mr. Sleesman, and Mr. Wilson was to follow with fungicide comparisons; regular vs concentrate applications and wettable-powder vs tank-mix formulations in tomato disease control.

Thursday's program calls for a paper on apple scab control by H. F. Winter; "Mite and Aphis Control on Apples," by C. R. Cutright; and a concentrate sprayer demonstration.

Mr. Winter and Mr. Cutright were to report on control of apple scab, mites and aphis with various new materials applied with both hydraulic and airblast equipment.

The group was then to visit the State Muck Farm at Celeryville, where Mr. Wilson and Mr. Sleesman were to talk on vegetable disease and insect control.



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THE LAMINATED BAG

Has All These Desirable Features:

Water-resistant **Weather-safe**
Siftproof **Odorproof**
Puncture-resistant
Acid-resisting **Grease-repellent**
Contamination-proof

Burlap (or cotton) on the outside, paper on the inside—the two laminated together with a smooth, even film of asphalt (or other special adhesives) to make a strong, protective bag guaranteed to preserve the original fine quality of your product.

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Our *Nearest* *Office*

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Isaac T. Rhea, Pres.

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TEXTILE BAG SPECIALISTS SINCE 1885

WHAT fine soil is, and ways to get it

This clearly-written manual on the soil—what it is, what makes it fertile, how man can help nature and can correct his own mistakes—will prove a truly practical guide to anyone concerned with farming. Here are methods for sampling and testing the soil to discover what's in it—guides to show you what should be in it—scientific and economical methods for giving it the necessary ingredients, or for keeping them in the soil if they are already there.

Check these seventeen authoritative chapters:

1. Introduction
2. The Physical Properties of Soils
3. Soil Moisture
4. Biological Properties of Soils
5. Chemical Composition of Soils
6. Soil Formation and Classification
7. Clay Minerals, Acidity, and Alkalinity
8. The Principles and Practice of Liming
9. Nitrogen
10. Phosphorus
11. Potassium
12. Fertilizers
13. The Utilization of Farm Manure
14. Sulfur and the Minor Elements
15. Variations in Plant Composition
16. Crop Rotations and Soil Fertility
17. Soil Erosion and Its Control

SOILS AND SOIL FERTILITY

By Louis M. Thompson

Professor of Soils and In Charge of the Farm Operation Curriculum
Iowa State College

330 pages, 6 x 9, 136 illustrations and diagrams, 132 tables, $5.00

This authoritative treatment begins by telling what soil is—what makes it up physically, chemically, biologically—and what its moisture-holding characteristics are. The author tells how soils form and are classified—using the modern basis of classification.

How to use commercial fertilizers (with emphasis on proper balance and economical yield) and how to use farm manure are explained at length. Other ways of keeping the soil fertile—by crop rotation and by holding back erosion—are completely covered. A chapter on variations in plant composition shows how the soil affects the makeup of plants.

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AGRICULTURAL CHEMICALS
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HOW TO combat weeds . . .

check their introduction, spread regrowth . . . effectively-economically

Here is an authoritative, thorough book that gives you all the data and practical help you need to prepare—and carry out—a tested, efficient, successful method of attack on any weed in any location quickly and effectively. Based on experience, research and experiment, it shows what methods of weed control have been proven most effective for weeds of all species—from crab grass to wild mustard—points out what methods can be applied economically in certain areas—shows how and when to apply a control measure, the season and rate of application, dosage, etc., and outlines the materials and machinery needed.

Quickly shows you how to eradicate

SPECIAL WEEDS
Bracken Fern
Canada Thistle
Horse Nettle
Nut Grass
Poison Ivy, Poison Sumac, Poison Oak
Prickly Pear
Quack Grass
Russian Thistle
Wild Garlic, Wild Onion

IN SPECIAL AREAS
meadow
pasture
range lands
lawns
golf greens and fairways
orchards
vineyards
along lakes and streams

WEED CONTROL

A Textbook and Manual

By WILFRED W. ROBBINS
ALDEN C. CRAFTS
and RICHARD N. RAYNOR
All at the College of Agriculture
University of California

543 pages, 6 x 9, 202 illustrations, charts, tables, $6.00

The book provides the farmer, horticulturist, greenskeeper, highway maintenance engineer, landscape gardener, etc., with a definite answer to his particular problem, indicating the methods that are especially adapted to meadow, grainfield, orchard, golf green, roadside, greenhouse, and other specific locations.

Add 3% Sales Tax in N. Y. City

AGRICULTURAL CHEMICALS
175 Fifth Ave. New York 10, N. Y.

Twiss Adds Smith to Staff

William A. Smith, formerly executive editor of *Oil, Paint and Drug Reporter*, has become vice-president of the House of J. Hayden Twiss, New York Advertising Agency. A 1936 graduate of Harvard, Mr. Smith was a reporter for Boston newspapers before joining the O.P.D. publication in 1939. Following three and one-half years service with the Air Forces in World War II, Mr. Smith returned to OPD in 1946 as news editor, became managing editor in 1947, and was appointed executive editor early this year.

Mr. Smith succeds Paul Slawter, formerly vice-president of the Twiss Agency, who recently resigned to join the Sterling Advertising Agency, also in New York City.

■

Hudson Gets Award

The Palatka, Florida, Division of Hudson Pulp & Paper Corp was recently presented with a special award for safe operation of the plant. The award was presented by the American Mutual Liability Insurance Co., to J. L. Richardson, resident manager of the mill. The company was cited for accumulating 729,963 man- hours of work without a lost time accident in 1951.

This mill produces multiwall sacks and gummed sealing tape in addition to other paper products.

■

DuPont Observes 150 Years

The 150th anniversary of the founding of E. I. du Pont deNemours & Co. was celebrated with ceremonies at Wilmington, Del., July 18th. Nearly 7,000 people participated in the celebration which was held on the site of the first du Pont mill on Brandywine Creek, on the outskirts of Wilmington. The principal address was made by Crawford H. Greenwalt, president of the du Pont Company who observed that the "vast unexplored area of science" opened up by advancing technology is a "new continent" fully as rich and as abundant as the geographical America of 150 years ago and "as full of promise for the future." He predicted that "the possibilities in increased productivity alone" from this world of science "are enough to expand our standard of living substantially beyond its present high level."

Du Pont entered the agricultural chemical field in the 20's with the purchase of the Grasselli Chemical Co., but had been a pioneer in the field of seed treatment since the end of World War I. Today it produces fertilizer materials, feed compounds, insecticides, fungicides, weed killers, seed-treating chemicals, agricultural explosives and various nutritive and veterinary products for agriculture.

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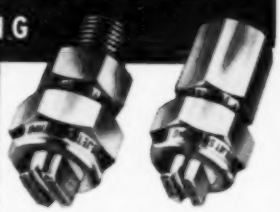

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Am. Potash Adds to Line

Sodium pentaborate and potassium pentaborate have been added to the line of chemicals produced by American Potash & Chemical Corp., Los Angeles, the company has announced. The former product is used as an herbicide and in cotton defoliation, the latter in certain industrial chemicals.

TECHNICAL BRIEFS

(*Continued from Page 69*)

rounding tissue, which feeds it during formation, is killed. Thus the leaf will wither and die on the plant. "Aero" Cyanamid has a wide dosage range in which true defoliation will take place.

—"American Cyanograms," Summer Issue, 1952.

•

New 20-20-20 Product

A new concentrated, water soluble 20-20-20- plant nutrient, "Plant-Shoot," has been introduced by Nott Manufacturing Co., Mount Vernon, N. Y. The product provides balanced nutrients for flowers, shrubs, potted plants, trees, evergreens, vegtables, lawns, and vines, the makers say. One pound of "Plant-Shoot" has a potential acidity equivalent to 900 pounds per ton of calcium carbonate. . . can be applied indoors or out, in any kind of weather.

ENTOMOLOGY

(*Continued from Page 40*)

Iran. Within 3 months, some 53,700 acres were sprayed in 18 widely separated localities. The significance of these operations had far-reaching effects when it was proved that aldrin, applied at the rate of 1.72 ounce per acre, would control the desert locust and that the material could be applied by plane, a method hitherto untried in any country infested by this locust.

Iran, like several other countries in the Near East, has an efficient organization for locust control, but the infestation in 1951 was too large for that country to cope with alone. That was why it requested help from the United States, as well as from Great Britain and Russia. Point Four's mobile air unit, cooperating with Iran's ground control organization, solved the problem in time to prevent major crop losses. The project demonstrated new methods and new techniques that have pointed the way to better international cooperation in a fight against an enemy that has plagued the Near East since Biblical days.

The effectiveness of aerial spray operations in Iran immediately prompted Pakistan and India to request identical assistance from the United States last summer. In similar demonstrational work in those countries, 16,600 acres were sprayed in Pakistan and 5,300 in India. In Pakistan it was discovered that oil diluents were not required for the aldrin concentrate, but that water would do just as well—and for much less money.

Before the outbreak of locusts in 1951, the Food and Agriculture Organization had made some progress toward international coordination of locust control efforts in both the Near

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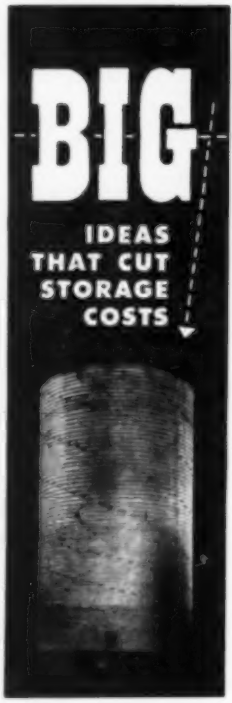

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East and in Central America. FAO, however, was unable to contribute financially or in any other material way to the existing control programs. The impact of last season's work by Point Four stimulated interest in and threw a new light on the locust problem throughout the entire infested area. In October 1951, FAO called a meeting in Rome, inviting technicians from desert locust-infested countries. A technical advisory committee on desert locust control was established. Its membership includes Egypt, France, India, Iran, Pakistan, the United Kingdom, and the United States. One of its chief purposes is to explore avenues of mutual aid and of international assistance. The committee held its first meeting in Rome in March, 1952. By that time, a regional project had already been set up and approved by Point Four, which provides for small spraying planes and insecticides to be used under the supervision and direction of a United states representative to the FAO committee. The technical aid would be administered under bilateral Point Four agreements with countries in the desert locust area.

At the Rome meeting FAO proposed to provide additional aid in the way of supplies, equipment, and insecticides for locust control, aid that was to be given under the direction of the FAO committee and under bilateral agreements with member nations. The committee agreed upon a system of priorities for supplies and equipment and the manner in which control activities would be worked out from country to country.

The purpose of the locust control program is to assist locust-infested countries by supplementing local control activities by demonstrating aerial spraying methods and by training local pilots how to fly and operate spraying planes. The United States program is thus coordinated with the FAO programs; to avoid overlapping of work, technicians of the British and local control units are cooperating with others in the field. FAO in Rome serves as a clearing house for all national and international locust-control activities.

Iran today is the scene of a seven-country program which will probably go down in history as one of the finest examples of international cooperation in pest control. There India, Pakistan, Turkey, Italy, Russia, and the United States are cooperating by supplying insecticides, bran, spray equipment, trucks, jeeps, and planes. In addition, the United States is supplying technical knowledge, furnishing two entomologists and the pilots.

The locust control in Iran began after operations had been under way in Iraq and Jordan for nearly two months. Swarms of locusts moving northward from the Arabian Peninsula have fanned out through the Kuwait Province, Iraq, and into Jordan. These have joined escapees of the past season to cover large areas in Iran and Pakistan. Although the situation is critical and the task a tremendous one, every effort is being made to win the fight. Preparations are being made to continue the fight into Pakistan, India, and Afghanistan during the summer.

This project is accomplishing more than killing locusts. It is warding off starvation. It is instilling confidence in people with whom we have had little contact in the past. It is making friends and good will for us. It is proving that cooperation among nations is vital even when it comes to protecting farm crops from insect plagues.★★

FUNGICIDES

(Continued from Page 63)

jacent fields and other areas where harvesting equipment was used in common.

The damage is confined largely to a reduction of seed yield rather than plant injury. Nematode infection in closely trimmed bent grass turf scarcely interferes with plant growth and disappears if the lawn is not permitted to produce inflorescence, but where bent grass is grown

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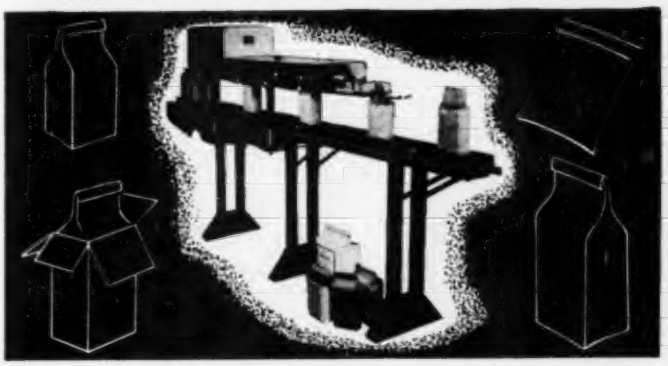

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for seed production, damage ranges from a trace to a complete crop failure and, on many bent grass fields harvested for seed year after year, the infection tends to increase in severity instead of remaining static.

Among the different kinds of controls investigated was soil treatment with various chemicals. Most of the bent grass fields concerned with these experiments were located in or near tide lands of the Pacific Northwest. Very few had been planted with bent grass, but were the result of a spread of this plant under natural conditions. Under such circumstances effective soil treatments with fumigants would cost more than the land was worth.

Sodium nitrate and cyanamid, each at the rate of 200 pounds per acre, were applied in the autumn to small plots of 1/1000 of an acre each in a heavily infested bent grass field, in order to stimulate the top growth of the grass. Agricultural sulfur was applied to other plots at 600 pounds per acre to determine if it might have any effect on the nematodes. There were four replications of each treatment. The top growth, including that on one-half of the three-foot alleyways, was removed with a power lawn mower the following late April and the "stubble" allowed to produce seed. The object was to determine if a large proportion of the nematodes could be removed by clipping this growth. Uncut alleys were left for unclipped check plots.

The above data show that there was no significant decrease in the relative amount of nematode infection resulting from the use of the chemicals tested.

DDT FORMULATION

(*Continued from page 33*)

The results reported to this point indicated that "Hi-Sil" had considerable promise as a new diluent for DDT, but it remained to be proved that the 75% DDT wettable powder produced with this diluent would comply with specifications. Tables V and VI show the requirements of the Quartermaster Corps and the World Health Organization, respectively, and the degree of compliance exhibited by the different formulations:

Table VI
Bulk Density of DDT Powders

Diluent	% DDT	Bulk Density (lbs./cu. ft.)
Hi-Sil	75	15.9
Silene	60	15.6
Clay	50	21.1

It can be seen that the wettable powders prepared in this study passed all the specifications of the Quartermaster Corps and the World Health Organization with the exception of the settling rate test and the requirement on pH. Efforts to improve the settling rate of the formulations were not made because this would have entailed a comprehensive investigation of wetting and dispersing agents and methods of incorporating them, and such a program did not appear necessary. This conclusion was based on the fact that commercial formulators have probably already encountered this problem in their own specialized operation, and the development of satisfactory procedures would best be handled by the individual formulator or by the manufacturers of wetting and dispersing agents.

The failure of the "Hi-Sil" formulation to meet the pH specification can be solved in several ways. The most obvious solution would be to employ a "Hi-Sil" of the required pH, and very recently Columbia-Southern has introduced such a material in semi-commercial quantities. This new silica, identified as "Hi-Sil C," has a pH range of .5 - 7.5 and a 75% DDT wettable powder prepared with it had a pH of 7.1, which complies with the QMC and WHO specifications. The remainder of the tests with this "Hi-Sil C" formulation showed results similar to those with regular "Hi-Sil."

Summary

THE use of "Hi-Sil" and "Silene" in the formulation of DDT wettable powders makes pos-

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sible the preparation of higher DDT concentrates than can be obtained with some other commercial diluents. With clay, the maximum DDT loading was 50%; with "Silene," 60%; and with "Hi-Sil," 75%.

It is indicated that the shutdown time due to plugging of the screens may be about the same with 75% DDT and "Hi-Sil" as with 50% DDT and clay.

With but few exceptions, each formulation passed all specifications of the QMC and WHO. The most promising diluent appears to be "Hi-Sil" because it will support a higher DDT loading, and because the insecticides tested show good stability in contact with this diluent, while a slight tendency for decomposition tends to occur in certain cases with "Silene."★★

Literature Cited

(1) Military Specification MIL-I-10108 (AMC) on "Insecticide, DDT 75 Percent, Water-Dispersible Powder." Dated January 31, 1950.

(2) World Health Organization Technical Report Series No. 34 (May, 1941). World Health Organization, Palais des Nations, Geneva, Switzerland.

(3) Fleck and Haller, J. Am. Chem. Sec., 66, 2095 (1944).

AMMONIA

(*Continued from Page 30*)

and preferably washed.

(10) A regular inspection of all hoses, compressors, and equipment in general should be carried out at scheduled intervals. Safety valves should be periodically removed, inspected, and tested. Unless a serious error is committed, tank safety valves should never have to relieve. They are the last line of defense and for that reason should never be neglected. In many steam boiler plants a regular inspection routine is to raise the steam pressure to see if the valves open properly. Unfortunately, it is not this easy with ammonia storage tanks since it is necessary to remove them from the tank to find the pressure at which they will open.

So far we have talked entirely about anhydrous ammonia because as previously stated the technique and equipment for handling this material is somewhat more exacting than for the various nitrogen solutions. We will touch on solutions briefly since the same general precautions should be followed for these other ammoniating solutions as the pressures they generate are due to ammonia gas, air, or a combination of the two.

Some of the solutions do not have a vapor pressure exceeding atmospheric up to about 100°F., while some have pressure up to 50# gauge at this temperature.

The solutions containing ammonium nitrate are corrosive to steel, therefore aluminum equipment should be used. If steel is used, the tanks gradually corrode and a great danger exists since it is almost impossible to determine the pressure rating of the tank. These solutions are normally handled by air pressure on the tank, therefore, a tank of unknown wall thickness is a potential bomb. The result of a steam boiler explosion when the drum actually ruptured is similar to what would happen should an ammonia tank corrode and rupture under air pressure.

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Throughout this discussion we have pointed out many hazards that exist in handling ammonia and have discussed the possible disastrous effects of mishandling. We have not meant to convey the thought that these disasters are to be expected. On the contrary, a well-designed and well-operated plant is a perfectly safe place. There is no reason why anhydrous ammonia and ammonia solutions cannot be handled safely—they are being handled safely every day and can continue to be handled safely if the rules are observed.★★

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OPPORTUNITY—Technical-minded salesmen with chemical, agronomy or related background and proven sales record to represent leading manufacturer of agricultural chemicals in midwestern and southeastern states. Challenging combination of sales and development. Qualified men will find permanent positions with attractive growth opportunity. Reply in confidence to Box No. 660 c/o Agricultural Chemicals.

SALESMAN WANTED: Established eastern agricultural chemical firm desires aggressive salesman for west coast with headquarters in Los Angeles area. Excellent opportunity for sincere individual. Address Box No. 661, c/o Agricultural Chemicals.

NATIONALLY KNOWN agricultural insecticide and fungicide manufacturer wants man in early thirties with sales experience to assist sales executive. Please give full details and salary requirements in first letter. Address Box No. 662, c/o Agricultural Chemicals.

CHEMICAL ENGINEER: Real opportunity for young man not over 30 years. No engineer so employed; therefore, individual initiative and developments will not be lost through maze of personnel. Variety of engineering duties. Agricultural chemical background desirable, but not essential. Philadelphia area. Address Box No. 663, c/o Agricultural Chemicals.

EMULSION CHEMIST
an unusual opportunity

Your knowledge and experience in emulsions and other surface active applications could make this the opportunity you have been looking for. We seek a man with practical field and laboratory experience to lead a formulation and application group in our research division. He must be capable of adapting new products and basic information to practical problems and of working directly with established customers. Background in emulsification of agricultural pesticides and herbicides is essential. If you believe you are this man, it will pay you to write at once, giving complete details of education and experience. Your reply will be kept confidential.

ROHM & HAAS COMPANY
Office of Technical Employment
5000 Richmond Street
Philadelphia 37, Pennsylvania

Miscellaneous

Buy-Trade-Sell: Phenol, Naphthalene, Para, DDT, BHC, Pyrethrum, Glycols, Cellosolves, Ethanolamines, Other Chemicals, Solvents, etc. Chemical Service Corporation, 86-02 Beaver St., New York 5, N. Y.

AGGRESSIVE, WELL-FINANCED, mid-western industrial organization wishes to enter agricultural chemical field. Preference is for high unit price products. Large research and engineering staff available. Will purchase all or part of going manufacturing business. Address Box No. 664, c/o Agricultural Chemicals.

SUPPLIERS BULLETINS

(Continued from Page 108)

Chemicals, Inc., now a subsidiary of the Pennsylvania Salt Mfg. Co. In testing and development work, the Niagara technical staff has had the cooperation of numerous state and federal agricultural workers in all major cotton growing areas of the United States.

The defoliating action of Niagarathal-DF Spray is said to approach a natural defoliation action of the plant rather than a caustic burning effect. "Niagarathal-DF" is especially suitable for use in aerial applications. Literature is available from Niagara Chemical Division, Middleport, New York, Dept. DF.

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MEETING CALENDAR

Ohio Pesticide Institute. Ohio Agricultural Experiment Station. Wooster, Ohio. Aug. 13 & 14.

Sixth International Grasslands Congress. Penn State College. State College, Pa.. August 17-23.

29th National Shade Tree Conference. Hotel Statler. Boston. Mass.. August 18-22.

Connecticut Agricultural Expm. Sta. Field Day. Experimental Farm. Mt. Carmel, Conn.. Aug. 20.

National Flying Farmers Convention. Alabama Polytechnic Institute. Auburn. Ala.. Aug. 27-30.

National Agricultural Chemicals Assn.. Essex & Sussex Hotel. Spring Lake. N. J.. Sept. 3, 4, 5.

American Phytopathological Society. Cornell University. Ithaca. N. Y.. September 9-12.

Fertilizer Section. American Chemical Society. Convention Hall. Atlantic City. N. J.. Sept. 14-19.

National Pest Control Association. Rice Hotel. Houston. Texas. October 20-22.

Meeting of Fertilizer Section of National Safety Congress. Chicago. Ill.. October 22 & 23.

Sixth Annual Beltwide Cotton Mechanization Conference. Bakersfield. California. Oct. 22-24.

California Fertilizer Association. Desert Inn. Palm Springs. Calif.. Nov. 10-12.

National Fertilizer Association Fall Meeting. Roney Plaza Hotel. Miami. Fla.. November 19-21.

Joint meeting. North Central Weed Control Conference and Western Canadian Weed Conference. Royal Alexandra Hotel. Winnipeg, Canada. December 8, 1952.

American Association of Economic Entomologists. Hotel Bellevue Stratford. Phila.. Pa., Dec. 15-18.

Tale Ends

NOT only do aerial crop dusters risk their necks in doing their job, but sometimes the weather buffets them around somewhat when they're just going from here to there. A recent flight of ten small planes, nine two-seater Stearmans and one Piper Cub, was scattered over a 200-mile area of Texas in a violent thunderstorm, but all landed safely despite the emergency. Flight leader Benjamin Gonzalez had no way of knowing how his fellow-pilots had fared, since all were separated and with no radios, could not communicate with him. Uncertainty reigned for six hours, until Pan American Airways pieced together bits of information and finally accounted for all ten planes and pilots. We suspect that Captain Gonzalez was a very thankful man upon learning of his crew's safe, but scattered landings.

But all airplane dusters don't fare so well, unfortunately. Two young men were killed and two injured in an on-the-ground collision of two planes at Phoenix, Ariz. recently. The craft crashed head-on while roaring along a runway obscured by clouds of dust stirred up by wind and backwash from propellers. Killed were Louis Gutierrez, 18, Sunnyslope, Ariz. and Martin Lieb, 17, Cactus, Ariz. The injured were Carl Nicholson, 35, Phoenix, and Jack Coyner, 35, also of Phoenix.

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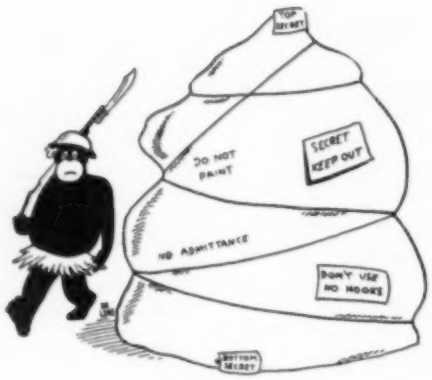
Louis Ware president of International Minerals & Chemical Corporation, and chairman of the board, National Fertilizer Association, left San Francisco July 1 with Mrs. Ware on a trip around the world by air. They expect to visit foreign offices and customers of the company and to study world trade conditions.

Stops will be made in Honolulu, Tokyo, Manila, Hongkong, Bangkok, Calcutta, Delhi, Bombay, Karachi, Beirut, Istanbul, London and New York City. They will be back in Chicago. which was the starting point of their trip, on September 2.

•

Senior class members of Western Michigan College's School of Pulp and Paper Technology were given a practical insight into the markets and manufacture of paper shipping sacks in an address on "Paper Bag Manufacturing" by Frederick E. Gross, manager of Chase Bag Company's Paper Bag Division. He emphasized the versatile and vital force of paper shipping sacks in the packaging field, pointing out that "There is hardly a product we eat, wear or otherwise use that at some stage in processing has not traveled in paper bags." Referring to the total bag industry volume, including textile containers, Mr. Gross pointed out that custom-made multiwall paper bags constitute about 60% of that volume.

Secret Weapon . . .



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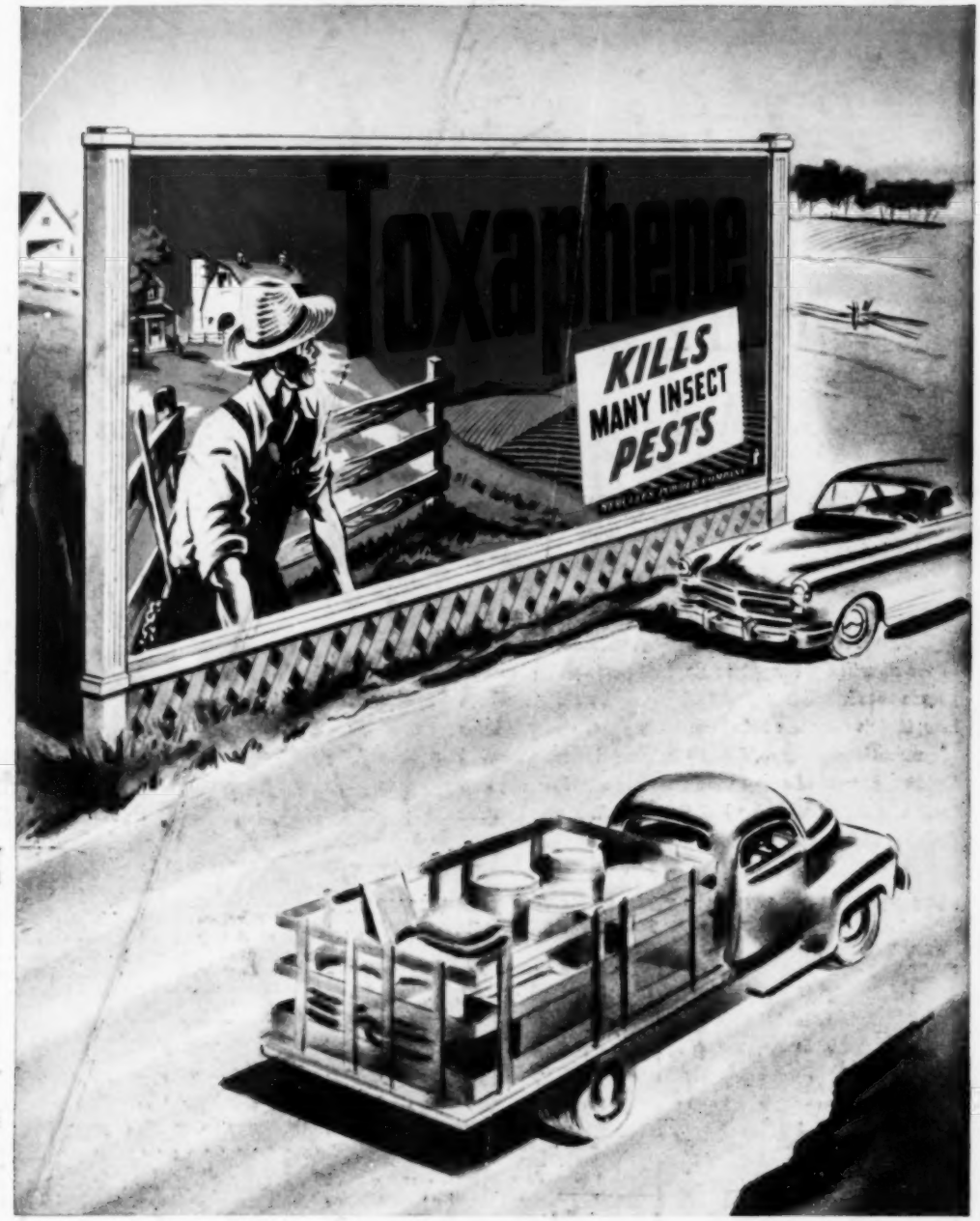

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